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APRIL 2001

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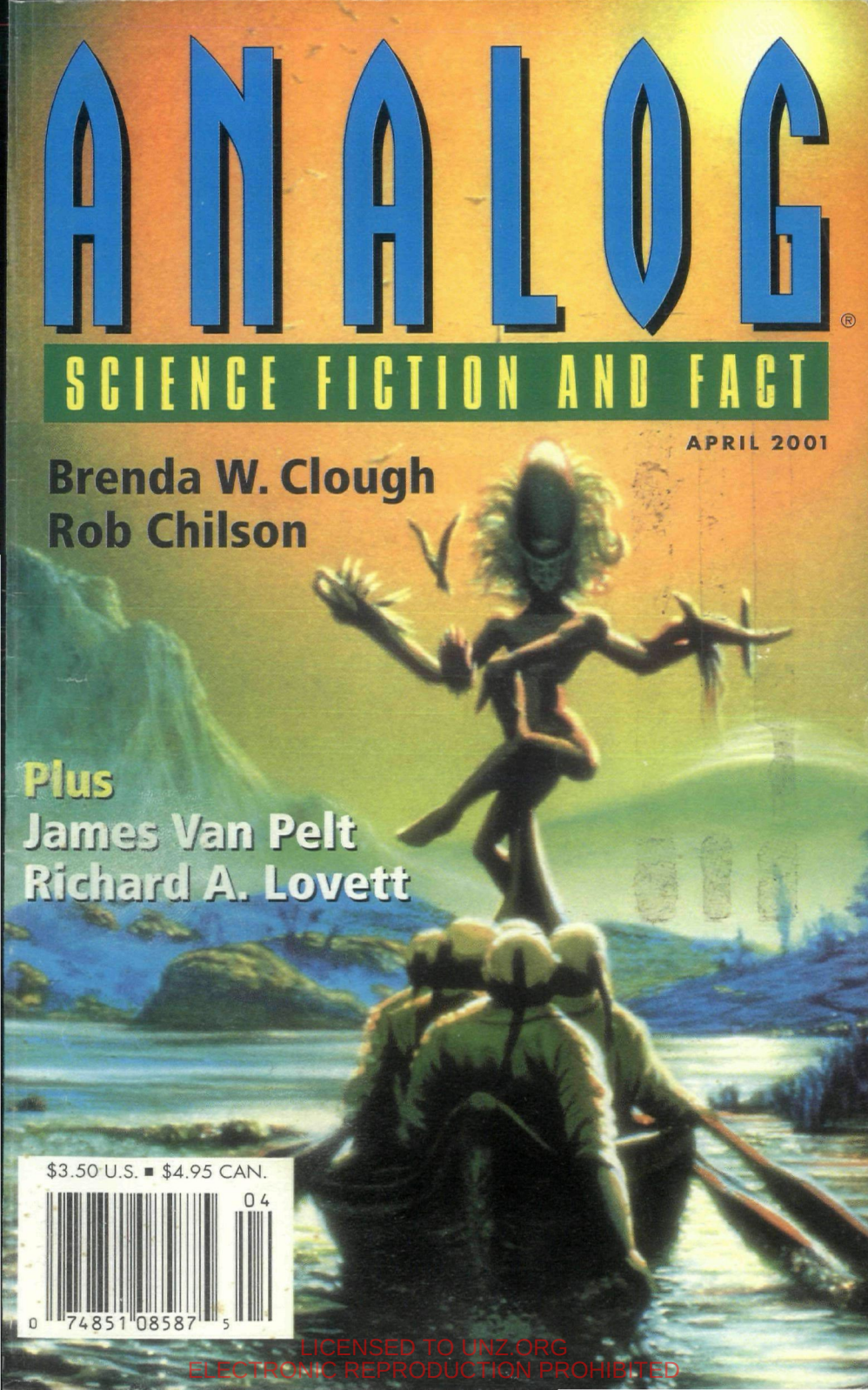

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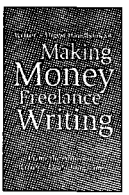

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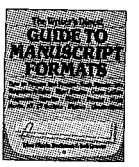

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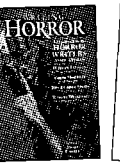

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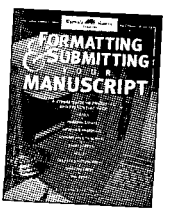

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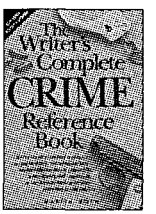

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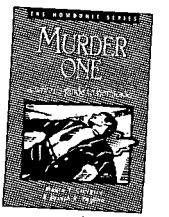

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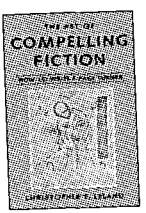

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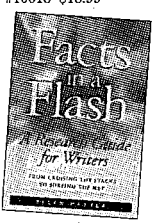

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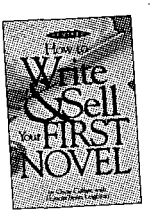

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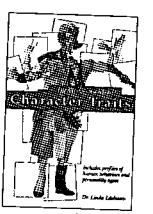

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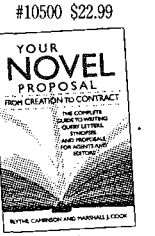

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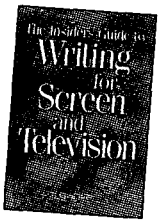

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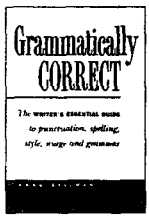

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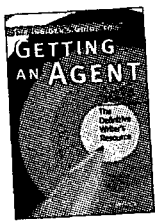

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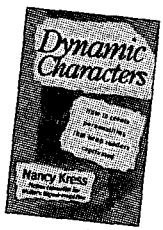

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SCIENCE FICTION AND FACT

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Next Issue on Sale
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55

96

NOVELLA

MAY BE SOME TIME, Brenda W. Clough ____ 10

NOVELETTES

PRESSURE GRADIENT, Pete D. Manison ____ 83
THE RISE AND FALL OF PACO COHEN AND THE MARIACHIS OF MARS, Ernest Hogan ____ 96
TALKING MONKEYS, Rob Chilson ____ 112

SHORT STORIES

WHAT WEENA KNEW, James Van Pelt ____ 55
THE WANDERLUST, Brian C. Coad ____ 68

SCIENCE FACT

UP IN SMOKE: HOW MT. ST. HELENS BLASTED CONVENTIONAL SCIENTIFIC WISDOM, Richard A. Lovett, Ph.D. ____ 42

READER'S DEPARTMENTS

THE EDITOR'S PAGE ____ 4
IN TIMES TO COME ____ 54
BIOLOG, Jay Kay Klein ____ 66
THE ALTERNATE VIEW, Jeffery D. Kooistra ____ 80
THE REFERENCE LIBRARY, Tom Easton ____ 133
BRASS TACKS ____ 139
UPCOMING EVENTS, Anthony Lewis ____ 144

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Indicia on Page 5
Online Chat Listing on Page 41

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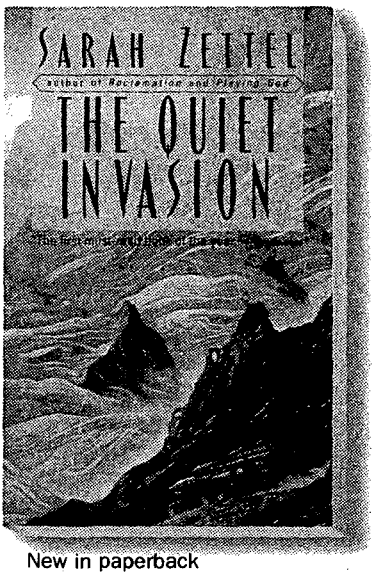

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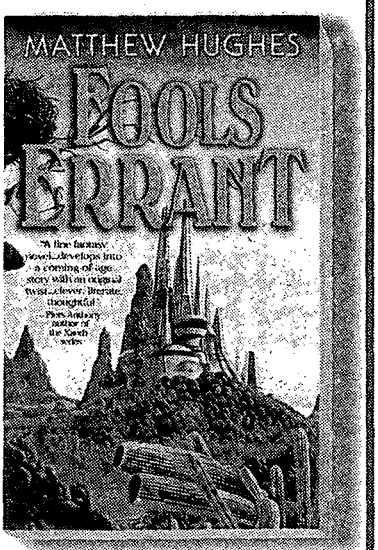

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EDITORIAL Stanley Schmidt

BELIEFS AND BELIEVERS

There was a time, back when magazine science fiction was new, when it occupied itself mainly with speculations about future scientific discoveries and technological inventions—space travel, for instance, and what sorts of things might live on other planets. Such things were considered wildly visionary back then, and most of the stories were primarily about the ideas.

The ideas are still important, but the range and scope of science fiction's concerns have broadened dramatically. That process started, perhaps, when John W. Campbell was editing this magazine (then called *Astounding*) and insisting that authors devote equal care and attention to the science and the fiction in their stories. Where an earlier story might have been primarily a showcase for an idea, such as the suggestion that satellites could be used for worldwide radio communication, a Campbell story based on the same idea would be more concerned with how that capability might affect the lives of human beings all over the world.

We still get the occasional nostalgic call for a return to the older, simpler kind of "gadget" story; but most readers now prefer the more in-depth, multidimensional approach to examining the consequences of an idea. The trend toward broadening horizons that Campbell arguably started has continued for several decades, and science fiction now routinely concerns itself with the Big Questions. Things like the origins of life, the Universe, and everything; the meanings of life and death and humanity; and morality and ethics—that whole thorny complex of problems about how people should behave, and why.

So does religion.

Since religion and science fiction are often dealing with the same issues, conflict—or at least the appearance of conflict—can sometimes arise. There are, of course, a good many stories in which religion and religious people play prominent and sympathetic roles, such as Walter M. Miller's *A Canticle for Leibowitz* and Stephen L. Burns's "Leap." But there are also cases where adherents of one faith or another feel that a story is an attack on that faith because it posits, for example, an account of the history of the Universe that contradicts the one in their own religious writings. There are even stories in which the Big Questions considered deal with religion itself: how it arose, how true its tenets might be, to what extent it has been a positive or negative force in human history, and how it might apply to nonhuman beings.

And, of course, in these "politically correct" times, there are those people who consider any such discussion, or any mention of their own religion in any but the most positive light, to be a personal attack on everyone who belongs to that faith—or on religion and religious people generally. From time to time we get a letter from someone attacking an author and everyone associated with publishing his story as a hate-

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monger who is rabidly and inexcusably anti-[you-fill-in-the-blank]. Such letters are rare, but tend to be vitriolic enough to make up in intensity what they lack in frequency.

They also tend, very strongly, to be based on sadly mistaken assumptions, generalizations, and misinterpretations. Three particularly common errors are:

(1) Failure to make a distinction between an opinion about a set of ideas and a character judgment about the people who hold them.

(2) Assuming that a criticism of an extremist faction of a major religion is a smear against the *entire* religion.

(3) Assuming that something said or thought by a character necessarily represents the opinion of the author or publisher, or the point of the work as a whole. (Thus have some school systems banned Mark Twain's *Huckleberry Finn* as "racist" because of its use of the word "nigger"—a remarkable bit of irony since anyone who actually read and understood the book would recognize it as one of the most *anti*-racist ever written.)

Some such accusations go beyond even those problems to such logical errors as equating one thing mentioned in a story to something of a completely different nature, even though the author would never have dreamed of such a connection. In one example, an author had tried to invent a believable name for a fictitious country. His intent was to *avoid* offending anyone by choosing a name that did not belong to any real country—but he unwittingly coined a word that happened to refer to an important religious writing in a language he did not know. He was promptly pounced upon by an indignant adherent of that religion who simply assumed that it was an intentional and gratuitous insult, and apparently thought the writer didn't know the difference between an imaginary nation and a real scripture.

Hence my main thesis for today: if you're going to argue philosophy, you *must* be careful to make distinctions between related but nonequivalent ideas. In that last example, the writer did not actually say, imply, or mean *anything* about the religion he was so vehemently accused of "demeaning and denigrating." But let's consider a different (and hypothetical) example in which a writer *did* suggest that a major tenet of some religion was not an accurate description of the Universe, and had led people to unnecessary and counterproductive or destructive actions. Is that an attack on either the belief or the believers? Well, it is certainly an opinion about—and a challenge to—the belief. That is not the same as a statement that the belief is Evil and must be stamped out.

And it is certainly not a statement that anyone who holds that belief is Evil and must be stamped out. Mature, intelligent human beings should be able to recognize that other mature, intelligent human beings can come to hold a very wide range of beliefs, for a very wide

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range of reasons. And they should be able to recognize that civilization requires them to respect the right of others to hold beliefs they don't agree with, at least as long as those beliefs don't lead to harmful actions against others.

Of course, sometimes they do. Writers are sometimes accused of being "anti-Christian" because they depict in an unfavorable light members of certain Christian sects who are so sure of the rightness of their beliefs that they try to forcibly impose them on everybody else. Readers who interpret that as "anti-Christian" are missing or ignoring at least three crucial facts. First, the "attacks" in these stories are not on Christians or Christianity *per se* but on the rabid evangelism of a certain subset—the fact that those few are *not* showing respect for the right of others to hold beliefs they do not share. Second, the rabid evangelists are not presented as representative of *all* Christians, or as exemplifying the essence of Christianity; they are a subset who may well be quite *un*representative of the field as a whole. Third, these fictional characters are not fabricated from whole cloth as gratuitously insulting caricatures of Christians generally. The ones I have seen have generally been obviously inspired by news about similar events in real life. Authors are writing about the dangers posed by fictitious militant fundamentalists because they are concerned about the dangers they see in *real* militant fundamentalists.

And the danger lies not in their being Christians, but in their being militant and intolerant. It happens that in present-day America, the people we most often see in that kind of behavior come from certain Christian sects, but that's a historical accident of our time. They can and sometimes do come from *any* ideological group. Another well-known contemporary example involves terrorism by certain Muslim sects. Many Muslim readers are quite naturally disturbed by anything they see as the association of terrorism with Islam *per se*, since the actions in question are as painful and offensive to many Muslims as they are to anyone else. But the unfortunate fact is that many of the most conspicuous examples of terrorism are done by groups claiming to do it as an expression of their faith, and outsiders are in a poor position to realize how unrepresentative they are. Perhaps the majority of both Christians and Muslims need to be concerned about the damage done to their overall public image by splinter

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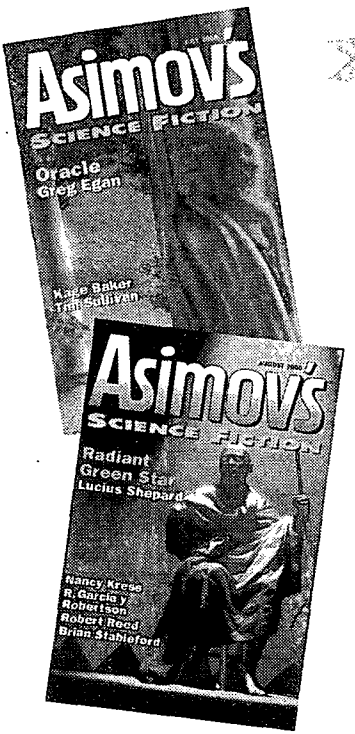

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groups who wrongly claim to speak for all of them.

The simple fact is that, in the kind of terms used to evaluate any other activity or movement, religions have done some very good things for humanity, and also some very bad ones. Religion has given many individuals the strength to endure personal crises and trying times. Some recent research suggests a statistical correlation between religious faith and various measures of physical and mental health. Religion has often been the main basis of cultural cohesion and a shared morality, and a repository and nurturer of learning. On the other hand, it has also led to a great deal of hatred, alienation, and bloodshed: crusades and jihads, persecution and execution of "heretics" and "infidels," suppression of scientific progress, individuals and whole peoples kept apart or at war for lifetimes or centuries because they were raised on different theologies, families torn apart because some member had the audacity to cross such barriers.

I would not presume to say whether the positive or negative effects on history were greater, or by how much, or how humankind can get the benefits without the detriments. But neither would I stand in the way of any thoughtful person who wants to consider such questions or any possible answers to them, because history says that those questions are profoundly important to the past and future of our species. I realize that from time to time such examinations will offend or discomfit somebody. Almost *anything* will offend or discomfit somebody, and the risk is especially high when you're looking at ideas that get close to people's most deeply held beliefs. But those are precisely the ideas that most need to be examined and reexamined.

A central premise of *Analog*, generally shared by both writers and readers, is that all ideas are open to question—although there even we have our limits. We are unlikely, for instance, to publish a story or essay seriously proposing that Hitler's ideas are good and should be acted upon. (Incidentally, this also points out an inconsistency in the position of some of our wounded critics. One said, "it is unacceptable in this day and age to attack any belief system," but I believe even that is subject to question. Practically everybody in this day and age attacks Hitler's belief system, and with good reason—and we'd better hope they continue to do so.)

But we do not impose even that kind of a limit lightly or comfortably. Putting *any* restrictions on what can be discussed is fundamentally at odds with the principle that human progress is best served by openness to questioning and reconsideration of *all* propositions. Putting the restriction that we cannot discuss or question certain ideas because they're part of somebody's religion would open a very dangerous gate indeed: the gate to banning discussion of virtually *anything* by making it part of a religion and therefore off limits. Humanity needs, and will probably always need, at least a few places where that kind of muzzling is not allowed.

It is very much the business of science fiction and related nonfiction to examine the Big Questions, including that of religion itself and its role in human history. We will not make blanket attacks on the moral character of Christians, Moslems, Jews, atheists, or any other religious group. But we will continue to represent a wide range of characters, including some with prejudices that we do not share or approve; we will continue to question actions that seem immoral or dangerous even if they're done in the name of some religion; and we will continue to ponder the Big Questions—*all* the big questions we can think of.

And we will trust our readers to be able to tell the difference. ■

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L. SPRAGUE DE CAMP, 1907-2000

Lyon Sprague de Camp, eminent "Golden Age" writer active in a wide range of fields until quite recently, died November 6, 2000, in his home town, Plano, Texas, some two weeks after a stroke and less than a month before his 93rd birthday.

Born in New York City on April 26, 1912, Sprague earned degrees in aeronautical engineering from the California and Stevens Institutes of Technology. During World War II he served (alongside Isaac Asimov and Robert A. Heinlein) in the United States Naval Reserve, attaining the rank of Lieutenant Commander. By that time his writing career had already been launched, with a co-authored textbook on inventions and the patent process—and the short story "The Isolinguals," in the September 1937 issue of this magazine (then called *Astounding*). He quickly became a prolific and popular contributor to both *Astounding* and its short-lived fantasy companion *Unknown*, playing an influential role in defining the distinctive brand of fantasy associated with that magazine. In such stories as *Lest Darkness Fall*, he was also a pioneer in creating the now-flourishing subfield of alternate history. He was also known for his work in historical fiction and a wide variety of nonfiction, from science fact articles to biography. His own autobiography, *Time and Chance*, won a Hugo Award, and he was the fourth recipient of the Grand Master Nebula Award in recognition of his entire outstanding career.

Known and admired for his personal attributes, including not only his thoroughly professional skill as a writer but the depth and breadth of his scholarship and a wildly whimsical sense of humor, Sprague also frequently collaborated with other writers, prominently including Fletcher Pratt, Lin Carter, and especially his wife of more than sixty years, Catherine Crook de Camp, who died earlier this year. We'll miss them both.

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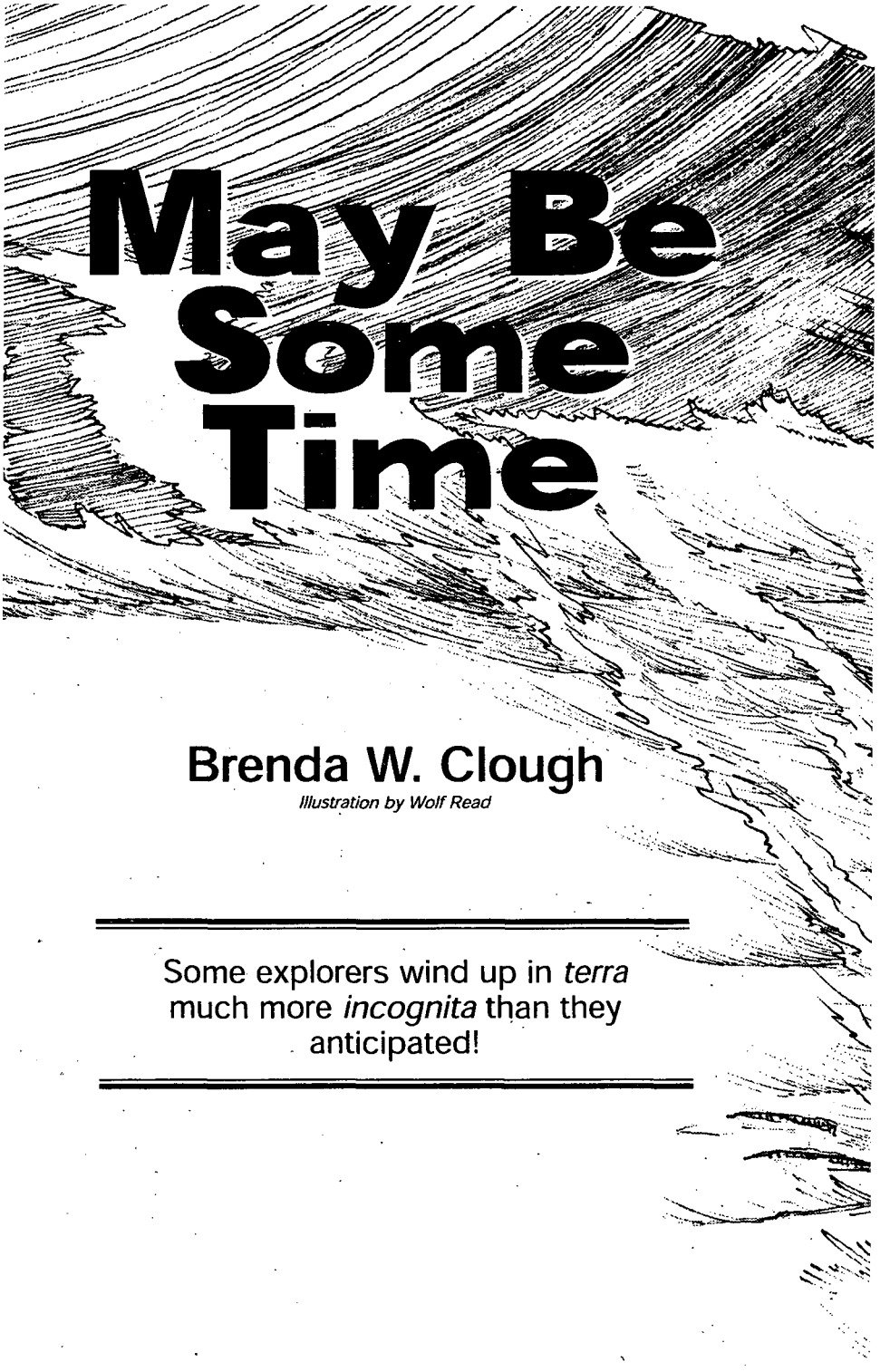

Brenda W. Clough

Illustration by Wolf Read

Some explorers wind up in *terra* much more *incognita* than they anticipated!

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From SCOTT'S LAST EXPEDITION by Robert Falcon Scott:

Friday, March 16, or Saturday, 17 [1912]. *Lost track of dates, but think the last correct. Tragedy all down the line. At lunch, the day before yesterday, poor Titus Oates said he could n't go on; he proposed we should leave him in his sleeping bag. That we could not do, and we induced him to come on, on the afternoon march. In spite of its awful nature for him he struggled on and we made a few miles. At night he was worse and we knew the end had come.*

Should this be found I want these facts recorded . . . We can testify to his bravery. He has borne intense suffering for weeks without complaint, and to the very last was able and willing to discuss outside subjects. He did not—would not—give up hope till the very end . . . He slept through the night before last, hoping not to wake; but he woke in the morning—yesterday. It was blowing a blizzard. He said, "I am just going outside and may be some time." He went out into the blizzard and we have not seen him since . . . We knew that poor Oates was walking to his death, but though we tried to dissuade him, we knew it was the act of a brave man and an English gentleman. We all hope to meet the end with a similar spirit, and assuredly the end is not far.

It's said that death from exposure is like slipping into warm sleep. Briefly, Titus Oates wondered what totty-headed pillock had first told that whisker. He no longer remembered what warmth was. He had endured too many futile hopes and broken dreams to look for an easy end now. Every step was like treading on razors, calling for a grim effort of will. Nevertheless without hesitating he hobbled on into the teeth of the storm. He did not look back. He knew the Polar Expedition's tent was already invisible behind him.

Finer than sand, the wind-driven snow scoured over his clenched eyelids, clogging nose and mouth. The cold drove ferocious spikes deep into his temples, and gnawed at the raw frostbite wounds on brow and nose and lip. Surely it was folly to continue to huddle into his threadbare windproof. What if he flung all resistance aside, and surrendered himself to the wailing Antarctic blizzard? Suddenly he yearned to dance, free of the weighty mitts and clothing. To embrace death and waltz away!

He had left his finnesko behind. Gangrene had swollen his frozen feet to the size of melons, the ominous black streaks stealing up past the ankles nearly to the knee. Yesterday it had taken hours to coax the fur boots on. Today he had not bothered. Now his woolen sock caught on something. Excruciating pain jolted his frozen foot, suppurating from the stinking black wounds where the toes used to be. Too weak to help himself, he stumbled forward. His crippled hands, bundled in the dogskin mitts, groped to break his fall. They touched nothing. He seemed to fall and fall, a slow endless drop into blank whiteness.

And it was true! A delicious warmth lapped him round like a blanket. Tears of relief and joy crept down his starveling cheeks and burnt in the frost fissures. He was being carried, warm and safe. Rock of Ages, cleft for me!

For a very long time he lay resting, not moving a muscle. Stillness is the very stuff of Heaven, when a man has marched nearly two thousand miles, hauling a half-tonne load miles a day for months, across the Barrier ice, up the Beardmore Glacier, to the South Pole and back. He slept, and when he wasn't actually asleep he was inert.

But after some unknowable time Titus slowly came to awareness again. He felt obscurely indignant, cheated of a just due. Wasn't Heaven supposed to be a place of eternal rest? He'd write a letter to the *Times* about it . . .

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"Maybe just a touch more?" one of the celestial host suggested, in distinctly American accents. Silly on the face of it, his unanalyzed assumption that all the denizens of Heaven were British . . .

"No, let's see how he does on four cc. How's the urine output?"

Shocked, Titus opened his eyes and looked down at himself. He was lying down, clothed in a pure white robe, all correct and as advertised. But were those a pair of angels lifting the hem? He used the drill-sergeant rasp he had picked up in the Army. "What the *hell* are you at?"

Both angels started horribly. Something metallic slipped from a heavenly hand and landed with a clatter on the shiny-clean floor. A beautiful angel with long black hair stared down at him, sea-blue eyes wide as saucers. "Oh my God. Oh my God, Shell! Look at this—he's conscious! Piotr will be like a dog with two tails!"

"Damn it, now the meter's gone."

As the other angel stooped nearer to pick up her tool, Titus stared at her face. It was tanned but flushed with irritation. The nose had freckles. She wore huge coppery hoop earrings, and her short curly hair was dull blonde, almost mousy. "You," Titus stated with conviction, "are not an angel."

The happy angel—no, blister it, a woman!—exclaimed, "An angel, Shell, did you hear that? He called you an angel."

"He did not! Don't you ever listen, Sabrina? He just said I was *not* an angel."

"This isn't the afterlife," Titus pursued doggedly. "Am I even dead?"

"Shell, this what we have you for. Hit it, quick!"

The irritable angel elbowed her companion into silence and spoke, clear and slow. "No, Captain Oates, you are not dead. We are doctors. I am Dr. Shell Gedeon, and this is Dr. Sabrina Trask. You are safe here, under our care."

Titus could hardly take her words in. His mind hared off after irrelevancies. He wanted to retort, "Stuff and nonsense! Women can't be doctors. They don't have the intellect!" But he clung to the important questions: "What about my team? Bowers, Wilson, Scott: Are they safe too?"

Dr. Trask drew in a breath, glancing at her colleague. Dr. Gedeon's voice was calm. "Let's stop the drip now, why don't we?"

"Excellent idea. If you'll pass me that swab . . ."

"They are all right, aren't they?" Titus demanded. "You rescued me, and you rescued them." The doctors didn't look round, fiddling with their mysterious instruments. "Aren't they?"

He wanted to leap up and search for his friends, or shake the truth out of these fake ministering angels, these impossible doctors. But a wave of warm melting sleep poured over him, soft as feathers, inexorable as winter, and he floated away on its downy tide.

Again when he woke he was met with pleasure: smooth sheets and a cool clean pillow. No reindeer-skin sleeping bag, no stink of horsemeat hoosh and unwashed men! He lay tasting the delicious sleek linen with every nerve and pore. How very strange to be so comfortable. His gangrened feet no longer hurt even where the covers rested on them. Double amputation above the knee, probably—the only treatment that could have saved his life. He had become reconciled to the idea of footlessness. Lazily he reached down the length of his leg with one hand to explore the stump.

The shock of touching his foot went all through his body, a galvanic impulse that jerked him upright. He flung back the covers and stared. His feet down to the toes were all present and accounted for, pink and clean and healthy. Even the toenails were just as they used to be, horn-yellow, thick and curved like vestigial hooves, instead of rotten-black and

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squelching to the touch. He wiggled the toes and flexed each foot with both hands, not trusting the evidence of eyes alone. It was undeniable. Somehow he had been restored, completely healed.

He examined the rest of himself. At the end, in spite of the dogskin mitts, his fingers had been blistered with frostbite to the colour and size of rotten bananas. Then the fluid in the blisters had frozen hard, until the least motion made the tormented joints crunch and grate as if they were stuffed with pebbles. Now his fingers were right as ninepence, flexing with painless ease: long, strong and sensitive, a horseman's hands.

The constant stab from the old wound in his thigh, grown unbearable from so much sledging, was gone. He leaped to his feet, staggering as the blood rushed dizzily away from his head. He sat for a moment until the vertigo passed, and then rose again to put his full weight on his left leg. Not so much as a twinge! He was clad in ordinary pyjamas, white and brown striped, and he slid the pants down. The ugly twisted scar on his thigh had opened up under the stress of malnutrition and overwork, until one would think the Boers shot him last week instead of in 1901. Now there was not a mark to be seen or felt, however closely he peered at the skin. Most wondrous of all, both legs were now the same length. The army doctors had promised that with the left set an inch shorter than the right, he would limp for the rest of his life.

He had to nerve himself before running a hand down his face. Such a natural action, but the last time he'd tried it the conjunction of blistered fingers and frozen dead-yellow nose had been a double agony so intense the sparks had swum in his eyes. But now it didn't hurt at all. His nose felt normal, the strong,straight Roman bridge no longer swollen like a beet-root. No black oozy frostbite sores, but only a rasp of bristle on his cheek. Even the earlobes—he was certain he'd left those behind on the Polar plateau! Incredulous, he looked round the room for a glass.

It was a small plain chamber, furnished with nothing but the bed and a chair. But there was a narrow window. He leaned on the sill, angling to glimpse his ghostly reflection in the pane. He ran his tongue over his teeth, firmly fixed again and no longer bleeding at the gums. His brown eyes were melancholy under the deep straight arch of brow bone, and his dark hair was shorn in an ordinary short-back-and-sides.

Suddenly he saw not the glass but through it, beyond and down. He leaned his forehead on the cool pane, smearing it with a sudden sweat. He was high, high up. Below was a city the like of which he had never seen, spread from horizon to horizon in the golden slanted light of either dawn or sunset. Buildings spangled with lights, gleaming in sheaths of glass, reared mountain-high. His own little window was thousands of feet up, far higher than the dome of St. Paul's even. Far below, vastly foreshortened, people scurried along the pavements. Shiny metal bugs teemed the ways and flitted through the skies.

"This isn't London." His voice had a shameful quaver. He forced himself to go on, to prove he could master it. "Nor Cairo. Nor Bombay . . ."

"You are in New York City, Captain Oates. As you will have observed, you have traveled in both space and time. This is the year of our Lord 2045."

Titus turned slowly. Though every word was plain English, he could hardly take in what the man was saying. With difficulty he said the first thing that came into his head: "Who the devil are you?"

Unoffended, the slim fair man smiled, revealing large perfect teeth. "I am Dr. Kevin Lash. And I'm here to help you adjust to life in the 21st century. We're connected, in a distant sort of way. My

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three-times great-grandmother was Mabel Beardsley, sister of the artist, Aubrey Beardsley. You may know her as a friend of Kathleen Scott."

"The Owner's wife." Titus grasped at this tenuous connection to the familiar. "Then—you're an Englishman!"

Dr. Lash continued to smile. "I was born in America, but yes, I'm of English extraction. Insofar as several generations of the melting pot have left me with any claim to . . ."

Titus crossed the room in a bound. He wrung Dr. Lash's slender hand as if he were his best friend in the world. In a sense this was true. The doctor was his only friend. Titus's inner turmoil was such that he only belatedly realized the doctor was continuing to talk. "Sorry—I'm afraid I didn't catch what you were saying. It's all quite a lot to take in."

"Absolutely, I don't doubt it." With an amiable nod, Dr. Lash sat down in the chair and waved Titus towards the bed. "A very natural reaction, given the tremendous change in your circumstances. I was outlining your schedule for the next day or so . . ."

And Titus was off and away again, sucked into an interlocking series of irrelevancies. It was stress, the alien environment all around, that made it so hard to concentrate. But recognizing why didn't help him focus any better. This time it was Dr. Lash's pronunciation that set Titus off: "schedule." Titus himself would have said "shed-jool." But Dr. Lash used "sked-jool," the American pronunciation. Indeed every word, his every tone and posture and gesture, spoke of the United States. So it must be true. "Damn it! Sorry—I'm trying to attend, believe me. But I keep going blah. My head's full of cotton wool."

Still unoffended, Dr. Lash smiled. "Not at all, Captain. I'd be happy to repeat or amplify anything you haven't quite grasped. I was giving you a quick outline of time as our theories suggest it applies in temporal travel. No man is an island, you know . . ."

Complete unto himself, Titus finished for him silently. So Lash was a man of education—must be, if he was a doctor. A doctor of what? Those two women, the sham angels, had obviously been medical-type doctors. But curse it, he had to listen!

Lash was saying, ". . . the tiniest change can have an incalculable impact. The death or life of an insect, a microbe even, may not be inconsiderable. Nothing can be plucked casually from the past, for fear of accidentally revising the world . . ."

The past? But of course. If this was the year 2045, then 1912 was long ago. "Is it possible to go back?" he interrupted.

"What, you, you mean? Return to the place and time you left? I believe it is impossible, Captain. But you would not wish it—to return and freeze to death in Antarctica? That was another subject of debate: the *moral* dimension of what we were attempting. It would be surely wrong to wrench away some poor fellow with a life ahead of him, family and friends . . ."

My family, Titus thought. Mother, Lilian, Violet, Bryan. My friends. I will never see them again. They might as well be dead. No—they are dead. Died years ago.

". . . an ideal subject," Dr. Lash was saying. "Not only are you a person rescued from a tragic death, but your removal is supremely unlikely to trigger any change in the time-stream, since your body was lost: presumed frozen solid, entombed in a glacier for eons . . ."

Titus stared down in silence at his pale bare feet. They were a little chilly now from resting so long on the uncarpeted floor, but that was all. Impossible to think of them frozen rock-hard, embalmed in eternal ice. Yet only a short time ago (or was it 133 years?), they were nearly so. "My team."

Interrupted in mid-discourse, Dr. Lash said, "I beg your pardon?"

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"The others. Scott, Wilson, Bowers. Did you rescue them too?"

"Ah . . . no."

"Then they made it. They got back to the depot, back home!"

Dr. Lash's copious flow of words seemed to be suffering a momentary blockage. "No."

Titus sat silent, his shoulders bowed. So his companions too had died. Had it all been for nothing then, all their work and sacrifice and heroism? "Why did you save only me, then?"

"Remember, Captain," Dr. Lash said patiently. "You are unique. Your body was never found."

"Just as well, since it was here. I'm here." He grappled with slippery verb tenses. "This is the future. You must have histories, newspapers. Records of Scott's Polar Expedition."

"And you shall see them. But, if I may make a suggestion, not today. You should recover your strength a little. The doctors have further tests—"

Titus growled in disgust. "No more doctors! Now!"

"Tomorrow," Dr. Lash promised. "Tomorrow I'll get the books. As you can see, it's already evening. Not the time to start a new project."

Titus stood to look out the window. Only the closest observation revealed that night had fallen. The city outside glowed and throbbed like a gala ballroom, its lights smearing the dark sky, blotting out stars and moon. So beautiful and strange!

" . . . a good night's sleep." Dr. Lash was getting to his feet. "And breakfast. I've tried to have food that isn't too strange for you . . ."

Titus hardly noticed the doctor's departure. The moving lights outside held him. The soaring and darting small sparks must be the metal bugs of before, lit for night work. Presumably behind every glowing window were people working and living. There must be thousands, millions of them. By night or by day the city was alive. He leaned his ear to the cold glass and heard its murmur, a dull continuous roar.

He realized he wanted nothing to do with it. This strange monstrous city was far more foreign than the Antarctic ice. The thought came to him that this was all delirium, the final flicker of phantasy in the brain of a dying man already half-buried in blizzard-drift. It wasn't even a delusion he enjoyed! A tremendous hollow longing for home filled him, for England, his family and friends, anything familiar. And there was nothing left to him now, except perhaps his own renewed body. At least this was as it had always been. He climbed back into bed and hugged himself, curled under the covers, diving into sleep's reprieve.

With the morning, Titus's courage rose again. No point in going into a funk, he told himself. I coaxed those damned ponies halfway to the Pole. I have the sand to cope with the future.

The breakfast Dr. Lash had promised did a great deal to restore his strength of mind—streaky bacon, odd toasted bready rounds, and buttered eggs. The tea in the flask was cat-lap, brewed with water that had come off the boil, and he could not identify the fruit from which the juice had been squeezed. But there was plenty of everything, a heaped plate on the little serving trolley and additional servings on the shelf below under covers to keep them hot. After months of short commons, the sight of so much food made him weak at the knees.

When Drs. Lash, Gedeon and Trask came in, Titus was mopping the plates clean with the last crust of bread. "Where are you putting it all?" Dr. Gedeon said, watching. "It's been a long time since your last decent meal."

Dr. Lash blinked in alarm. "Gently there, Shell. I'm trying not to confront him with too much just yet."

Dr. Trask fished a stethoscope out of her pocket, hung it round her neck by

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the ear pieces, and beamed upon him as if she were offering him a splendid gift. "I'm going to check you over, Captain."

Grudgingly he allowed her to listen to his heart, and look into his eyes and ears with a shiny metal instrument. She did other mysterious tasks too, with rubber tubes and bits, or holding little tools that blinked or flashed colors against his arms and legs. "Physically OK," she pronounced at last. "He was strong as an elephant in the first place, to survive what he went through. So he had a good foundation to build on."

"And you always do good work, Sabrina," Dr. Gedeon said. "What about his mental and cognitive recovery, Kev?"

"Well, yesterday we weren't quite ourselves, were we, Captain?" Dr. Lash said. "But at his suggestion—his insistence, in fact—I have a simple test all prepared."

"All that historical stuff? Don't tell me you want to teach him to surf the net."

"Of course not—the books will be plenty." Dr. Lash pushed the serving trolley out into the hall, and returned immediately with a different cart, loaded with several dozen books of all sizes. "Captain, you asked about the fate of your friends. As you can see, there's quite a lot of literature on the subject. Also, in preparation for your reception I had much of the archival material, the articles and so on, transferred to hard copy last year—forgive me, I should say printed out onto paper and fastened together into these makeshift volumes."

"These?" Tentatively, Titus touched a stack of weird shiny books. "Are they glass?"

Dr. Trask smiled, but Dr. Gedeon said, "Titus—is it all right to call you Titus? I'm going to teach you one of the most important terms of this modern age. No, hush up, Kev—you have to give the poor man a few tools to handle his environment. These floppy covers are plastic. So is this binding on the spine. Plastic—remember that word."

"But the pages inside are plain old paper, just like in your day," Dr. Lash added.

Titus picked up the top book. The slick but stiff substance—plastic!—of the cover slipped in his unaccustomed fingers. The book flopped open in its fall to the coverlet, and he looked down at it into the photograph of a familiar face: Dr. Edward Wilson, his hands in their mitts akimbo on the ski poles, grinning into the camera from under the rolled brim of his sledging cap as if death could never touch him. "Uncle Bill," he said, stunned.

"We know he was your friend," Dr. Gedeon said softly.

Dr. Lash sat down on the bed beside him. "Keep in mind though, Titus, that you've traveled. Even if all had gone well with your expedition, he would be long deceased. Your loss is no less. But it's inevitable, a natural progression."

Titus seized a less strange volume, a fat grey book titled *Scott's Antarctic Expedition*. More ferocious than the need for food, the thirst for his past was suddenly overwhelming, parching his mouth. "For God's sake, leave me alone and let me read!"

"You wouldn't prefer to have me present, to answer any questions?"

"No—please! Go away!"

"Come on, Kev." Dr. Gedeon jerked her blonde head at the door. "Leave him in peace."

"We can come back in a while," Dr. Trask said.

Reluctantly Dr. Lash allowed himself to be drawn away in a trail of discourse. "During this initial adjustment period I think that slow progress is the ideal . . ." And mercifully they were gone.

The books, the proper ones, were antiques. Everything about them proclaimed it, their smell of yellowy paper and dust, the alarming crack of their spines when Titus opened them, the flakes of brittle glue that sprinkled his pyjama lap. A film of fine greyish grime coated the top edges of the pages and came off on his fingers. How terrifying

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then, to see the photographs he remembered posing for only months ago! These men, that pony, those dogs: they weren't old. How could they be, when the memory was so new? But the books belied him.

And it was a jolt to glance at the text and realize that he was reading excerpts from Scott's personal diary. The Owner was—had been—a meticulous diarist, but the volumes were of course private. Titus flushed with embarrassment, to thus pry into a comrade's innermost thoughts. But here they were, all the juicy tidbits printed in a book, and an old one at that. Everything in them was common knowledge, public property for more than a century. Titus had kept journals himself, sent letters home, written to family and friends. He gulped, wondering now if they were printed here too. Figures of history have no privacy.

But enough shilly-shallying! He paged rapidly through the book, skimming along the months and days. The journey to lay One-Ton Depot; daily life in the camp; the Polar trek; a photograph of Roald Amundsen and his team standing bareheaded before the Norwegian flag at the Pole. Titus glowered at it and turned the page. Towards the last he had lost track of the days, but Wilson or Scott would have kept good count.

And here it was. Titus bent over the book, scarcely aware of the chilly floor or the crick in his neck. The end of the story at last: eleven miles short of the depot, Scott and Wilson and Bowers had frozen and starved to death. Titus exhaled a long silent breath. The unfairness of it, the waste! The print blurred as his eyes filled.

This is history, he reminded himself. It's over, long over, poor devils! But his heart refused to go along with it. Suddenly the coolness of the room seemed malevolent. He piled the pillows up at the head of the bed and sat against them, armoured in covers pulled up round his chest, to read—to dive into the books that held all that remained of his world.

He devoured them, the different journals—the egotists, had every member of the expedition published his journal?—the scholarly analyses, the biography of Amundsen, the biographies of Scott. When he had read them all, he looked at them again and then yet again, chewing them over, extracting new meanings and significances.

He noticed for instance that different meanings could be wrung out of the same set of events. Scott was praised as a hero and damned as an incompetent, his expedition the last flower of the golden Edwardian afternoon or the first tremor of a collapsing empire. And the theories of why the expedition failed! There were more candidates than he would have ever imagined: deteriorating washers in the fuel tins, crocked Manchurian ponies, Wilson's poor medical supervision, Scott's bad decisions, even—this made him wince—his own excessive endurance and bravery.

But surely the eeriest experience of all was reading the account of his own death. Scott's journal entry was quoted time and again. 'Able and willing to discuss outside subjects'? Titus could recall nothing of it—perhaps he had muttered something about his yacht, in semi-delirium. Odd, but entirely characteristic of the Owner to find that admirable. And the paintings and memorial statuettes of himself! He turned past them, averting his eyes.

Vaguely he was aware of Dr. Lash popping in and out, talking and asking questions, of the rattle of the food trolley as it came in and went out. Titus paid none of it any mind, focused with a ferocious concentration on the past. He only looked up when a slim pale hand laid itself flat on his page. "I beg your pardon?"

"Titus, you've been slaving away for the entire day. Do you think you would care to quit for the night? Maybe have a meal? You have to take care of your-

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self—"

"Hell's bells, man, must you *hover?* I'm perfectly fine!" Titus jumped to his feet and to his dismay fell head-foremost onto the food trolley. He didn't quite faint, but the black buzzing in his eyes was curiously reminiscent of it. There was the hot oily splash of soup or gravy on his chest, a tremendous clatter of falling crockery, and over it Dr. Lash shouting for help.

He came to himself in bed once more, clean and dry in fresh pyjamas, blue and white striped this time. The female doctors were there again, the plumper blonde holding his wrist while the tall dazzling brunette directed her mysterious tools at it. "Dr.—Gedeon, is it," he murmured. "And Dr.—Dr. Trask."

"Oh, so you're talking again," Dr. Trask said. "And you remember our names, that's a good sign."

Dr. Gedeon scowled at the little machine in her hand. "He read all day yesterday? Wonderful. Very clever of you, Kev."

"That's unfair, Shell," Dr. Lash said, tightlipped. "And the vid record will bear me out."

"He *said* he felt perfectly fine," Dr. Trask said.

"And Kev believed him. Yeah, right." Dr. Gedeon folded up one tool and took out another. "A man whose chief claim to fame is that he committed suicide to save his team. You wouldn't keep a Pomeranian kenneled up this way, never mind a man used to an active lifestyle—"

"I'm giving him the dignity of a rational being. You, night and day training with the Fortie team, wouldn't realize—"

Titus lay back and let the quarrel roll over him. He didn't grasp what the difficulty was, and didn't much care. In the Army he had learned to hole up when the brass had a row. Instead he assessed his surroundings again. Vaguely he remembered that while he was reading the sunshine had crept across the window and faded, an entire day's passage. And then a period of oblivion, and now the light streamed in through the glass again, a new day. Perhaps midmorning, judging from the angle of the light. The trolley stood near the bed, laden anew with covered dishes. It would be a great pity to let the meal get cold. He slid the nearest plate off the shelf onto his knees and seized a fork, suddenly famished. Would he ever get enough food again?

Dr. Lash thumped the hospital bed rail with both hands. "All right, a walk then! But let's try to keep the chronal displacement shock at a minimum, all right? Through the park, not the streets."

"Shell will go along, won't you, Shell?" Dr. Trask's brilliant blue gaze shifted to her associate. "You can fit him into your exercise routine."

Dr. Gedeon turned to Titus, who hastily gulped down his mouthful. "Be dressed and ready at 12:30," she said. "And make them give you a pair of decent shoes. You can't walk in slippers in New York—there are always jerks who don't scoop after their dogs."

On that gnomic statement she swept out of the room. "I'd hoped to postpone this, Titus old man," Dr. Lash said, shaking his head. "But the ladies, God bless 'em . . . At any rate, while we fit you up with some walking shoes, we can go over a couple of routines that may ease the chronal displacement for you."

"Don't concern yourself," Titus said. "How difficult could a walk be?"

Dr. Trask sighed at this, folding up her shining tools.

Titus's cocky self-confidence only began to shake when he and Dr. Lash met Dr. Gedeon in the hall. She wore the most outré clothing he had ever seen on a female. Even the street beggars in Calcutta didn't go about bare to above the knees. It was indecent, shocking—wrong! The only possible conclusion to draw was that the woman was a whore. If they allowed women to become doctors, surely it was not a very much further descent to let in whores? One re-

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spected doctors, but light-skirts were owed only contempt. Nothing in Shell's demeanor seemed to allow disrespect, however. The contradictions inherent in the situation made him giddy. Suddenly Dr. Lash's words, repeated over and over, sank in: "Don't let it get to you. All that stuff, it's unimportant, nothing to do with you. Let it roll off your back, like water off a duck. Accept, nod, and move on . . ."

Titus nodded at Dr. Gedeon and moved on. Dash it, there were more important things to do now. He would worry about bare knees later. Dr. Lash held the door to the stair for them. Titus followed Dr. Gedeon down and down, dozens of flights of echoing steel stairs quite empty except for themselves. "Does nobody else use this building?" he asked.

Dr. Gedeon glanced back, surprised. "Most Paticalars use the elevator—oops, sorry, Kev!"

Water off a duck, Titus said to himself. Nothing to do with me really. But he was unable to resist adding the new words to the list. Paticalar, elevator, plastic—he ought to start a notebook like the Polar scientists, and illustrate them with water-colour. "And ought I have a hat?"

"A *hat?*" Both moderns looked so blank, Titus immediately saw that hats were dead out of fashion. In his day a gentleman rarely stepped out of doors without some sort of head covering, summer or winter. In fact he noticed now that the entire party was free of the impedimentia an Edwardian outing would entail—no gloves or walking sticks, muffs or card-cases, hats or topees, purses or parasols. For a moment it was almost discomposing, to have nothing to fill one's hands. But then he thought of his walks as a child, when the grown-ups had to do all the carrying, and it was deliciously freeing instead.

The stair ended at another door. Through, past a lobby beyond, and . . .

Titus felt his mouth go dry. He had stepped into a street as strange as the far side of the moon. And so damn busy! Machines he couldn't name whizzed past, big and small, making noises he had no word for. People surged round him, hatless indeed, dressed in colourful grotesque garb and doing or eating or saying things that he could not name. Were those little machines on their heads, or merely elaborate hairdos? Were those scars on the bare legs and arms, or paint, or some attenuated garment? Strange smells assailed his nose, tempting appetite, revolting, attracting in turn. Colour and light poured over him too quickly for comprehension. And the noise! Worse than the beggars in Cairo, worse than Covent Garden market. The wail and clatter and roar of the 21st century slapped him in the face and drove all rational thought from his head.

He found he was clutching his companions, Dr. Lash on his left and Dr. Gedeon on his right, flank to flank as if they were breasting a mighty river in full flood. Somehow they passed together through the howling chaos to a haven, a refuge of calmness and green, and Titus became aware of Dr. Lash's steady lecturing again. Apparently he had been talking all this while: "Don't think about it. Ignore her. It's all rolling off you. Has no effect, eh? Someday when you're up to it you can easily figure it out. But now, today, you don't have to . . ."

"You know," Titus mumbled.

"Yes?"

"You know, Lash, you can be bloody damn tiresome," Titus said, all in a breath. His vision cleared. The object in front of him was blessedly familiar. "A tree! First one I've seen in—" He halted, confused. Was it a year and a half, or a hundred and thirty?

"You're feeling better," Dr. Lash noted.

Titus nodded. The vertiginous sense of unreality seeped away fast as it had

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come. The vista before him now would have been familiar to a man of any era: rolling grassland studded with handsome clumps of trees. If one didn't look beyond, at the clifflike buildings towering above the treeline, it was an environment Titus knew down in his bones. Carefully, he didn't look. He drew a deep happy breath, eased from a constraint he had not recognized until now.

Dr. Gedeon lifted what he realized was a small rucksack from her back—he had assumed her jacket was merely cut strangely. She took out two dumbbells, saying, "You want to set the pace, Kev?"

"I'm not going far," Dr. Lash said. "My asthma will start up if I push it."

"Let's take the reservoir path then." Dr. Gedeon clenched a weight in each small fist and began to walk briskly down the path. Titus and Dr. Lash followed.

An almost frightening sense of well-being possessed Titus. He had not felt so fit, so confident, so brimful of vigour, in ages. The dear old sun shone behind leaves as cleanly cut as paper, and birds sang with enthusiasm. A breeze blew cool and damp from the reservoir below, freighted with a slight scummy smell. Titus inhaled it like incense. He stretched his legs, striding out with long steps. Surely it would be possible to live in just the familiar bits of this new era, comforting and safe areas like this park?

Dr. Gedeon grinned at him when he caught her up, her teeth very white in her tanned face. "Great, isn't it?"

"Yes." Carefully he did not look down past her face. She had accurately pinpointed the medicine he needed. Perhaps she wasn't a bogus sawbones after all.

"Hold up, you two," Dr. Lash called. He had fallen far behind, wheezing.

Dr. Gedeon reversed course immediately. "Did you bring your inhaler?"

"Of course." Dr. Lash appeared to be sniffing medicine from a large white tube. Concerned, Titus watched him closely. The dose did seem to help.

Dr. Gedeon said, "You'd better go straight back to the office and take an antihistamine. Shall we come back with you?"

"No, don't bother," Dr. Lash said. "I'll be fine. This happens all the time," he added to Titus.

"It shouldn't," Dr. Gedeon said. "You should have your condition assessed by a qualified allergist. Asthma can be a killer."

Asthma, Titus mused—another new word. Dr. Lash brushed her concerns aside. "Keep a close eye on Titus," he said. "Once only around the park, and then come straight back. This is his first experience, remember."

"A walk round the park?" Titus snorted. "Don't make me laugh, Lash."

"I'll take good care of him," Dr. Gedeon said. "Now off you go."

Only when Lash was out of sight did Titus realize how confining his fuss and mother-hen admonitions had been. Dr. Gedeon, a real medico and female to boot, had a more robust outlook, more to Titus's taste. "I think we should run," he said. "Fast."

"All right. Race you to that bench!"

And she was off, surprisingly speedy in spite of a womanish rocking-horse gait that would have made a pony blush. How delightful it was to use the limbs like this! Titus made his best effort, trying to use his greater length of leg to advantage, but she beat him handily. Carrying a weight handicap, too! He felt only a moment of obscure outrage before laughter overtook him. "Bravo!"

She laughed too. "Not a real contest, against a disabled vet."

"Ludicrous. The leg wound hasn't bothered me in years."

"Not till recently."

He stared in astonishment—how could anyone know that? He had hidden the disintegrating scar even from Scott and Wilson until the very end. And he knew from the books that Scott, the last expedition member to keep records, had not mentioned it. She went on, "I

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watched Sabrina glue you back together again, remember? One of the symptoms of scurvy is old wounds breaking out again."

"Whatever she did patched it up fine. I couldn't even find the scar."

"She's a whiz. It was worth all the cloning work, to see you trying out your leg, and feeling your toes for the first time."

"You saw me? But, but I was alone in my room."

She grimaced. "Titus, you're unique and valuable—the first and possibly last man to travel through time. And not only that—you are a patient. We've been monitoring you all during your recovery. You have never been alone or unobserved since you arrived."

He remembered the shiny metal tools, the gleaming examination table cleaner than anything he had ever seen. "How long have I been here?"

"You traveled to the modern era a year and a half ago."

He stared at the trees, trying to take her words in. For eighteen months he had been clay on the wheel, dough under the rolling pin—a chunk of inert material upon which skilled hands worked. It was a sodding liberty! And surely he could not have spent all that time flat on his back in a hospital bed. He had done that in 1901, and knew well how one's legs became weak as string and the muscles wasted away for want of use. Now his legs were a little shaky and his skin unusually pale, but otherwise he was himself, in good working order. They must have been exercising his limbs, working and testing and *using* his body in ways he couldn't conceive of, with all the conscious consent one would get from the clockwork goatherd in a Swiss cuckoo clock. Returning him to consciousness the day before yesterday was only the capstone of a major project—it was obvious in retrospect that his first short encounter with the 21st century, swearing on the shiny-clean table, had been unplanned. He wondered how many people were employed on the task. The thought of unseen eyes spying on him day and night made his spine crawl. "Are they watching us now?"

"Here in the park? Well, *I'm* in charge, watching you, but that's all. C'mon, Titus, don't let it worry you. There's a lot for you to get used to. Here." She took water bottles from her rucksack and, opening one, passed it over.

He drank, hefting the weird featherweight container. "Plastic?"

She smiled. "You're a sharp one." He felt absurdly chuffed at this praise from a modern.

They walked on at a slower pace. The path was narrow here, crowded closer to the tall wrought-iron palings of the park fence by trees and brush. Beyond the palings was a city street. It was a quieter one, without the surging crowds and thundering vehicular traffic near the first building, but still Titus felt like a lion safe behind the zoo bars. "Are those commercial buildings?"

"Those tall ones over there, you mean? Oh, no—co-ops, I think. Damn! What I mean is, they're residences. People live there." He knew his face was blank with ignorance, because she waved her hands in rhythm with her stride, trying to explain. "I mean separately, not all together. Condos. Cells. Divisions." She groped for more synonyms.

The penny dropped. "You mean, it's a block of flats."

"Is that what you call it? OK then!" She blew out a relieved breath. "I should've listened better, when Kev was going through his British-versus-American word lists with us."

Titus smiled. "'Two countries, divided by a common tongue.'"

"Exactly. It's surprising how hard it can be to communicate clearly."

"And that." The architecture was so powerfully familiar he could hardly believe it. "A church."

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"Yep." She peered through the railings at the signboard on the pavement across the street. "Saint Somebody's Noontime Service. And will you look at that sermon! 'Is God a Fortie?'"

Titus's religion was nominal, no more than a tradition of his class. But the organ music pouring forth from the open doors of the church drew him in like a hooked fish. "I know that tune!" He hummed along, and then sang the words that rose unbidden from the depths of memory. "'Crown him with many crowns, the Lamb upon his throne . . .'"

Dr. Gedeon sighed. "You must be a Christian. Everybody was, back then. You want to go in, don't you? And I'm dying to hear that sermon."

He nodded. She found a gate, and they crossed the street, she holding him back until a gap opened in the traffic. But Titus took the lead up the steps into the dark Romanesque arch of the portico, and dragged Dr. Gedeon into the haven of the rear pew.

A number of wrongnesses immediately struck him. Electric lights dangled from the arched ceiling and spotlighted the stained glass windows—Titus could not remember ever seeing a church fitted with electricity. The windows themselves were gratingly ugly in their modernity. Uplifted in the homily, the voice of the celebrant rang jangly and loud, amplified in some uncouth modern way. The dozen members of the congregation were almost blasphemously dressed. Titus gulped down a deep breath and tried to concentrate.

"—not only are they ineffable. As Jehovah in the Old Testament had his chosen prophets, the Forties communicate through those who can understand them—in their case, the scientists and astronomers who have translated their message . . ."

Titus scowled, uncomprehending. What were the Forties—the time period, the 2040s? Dear God, what had happened to the faith of our fathers? But then the music rolled from the pipe organ, a hymn from his boyhood. The last time he had heard this tune was at Sunday morning prayers in the little stone church in Gestingthorpe village, where as the young squire of the manor he had presided in the family pew. Homesickness rose up in his throat. His soul balked like an overtried horse at the new and ugly and strange. He ached to go home, to the place and time where such songs were part of daily life. Though he knew the words he could not join in.

It was the closing hymn. The priest pronounced a benediction, and the congregation straggled down the aisle and out into the sunshine. Dr. Gedeon fidgeted but did not rise, while Titus struggled with his misery. The priest, saying goodbye to the tardiest old lady, noticed the new faces in his flock and came down the aisle. Dr. Gedeon smiled up at him. "Just visiting."

"You're very welcome all the same," the priest said. He was a tall balding man in a dog collar, the image of a regimental padre.

Dr. Gedeon stood up and shepherded Titus out into the aisle. "I'm so thrilled to hear a homily about the Fortie project!"

"It's on everybody's mind, so every denomination has to throw in their two cents' worth. There's even a rumor the Pope is writing an encyclical."

"I think Titus here is an Anglican," she said in a helpful spirit. "And I'm Shulamith Gedeon."

"So you're the dancing doctor! I'm Rev. Pollard. We call it Episcopal in this country, but that's just terminology."

"Shulamith?" Titus's jaw slacked with astonishment. 'Shell' must be a nickname, just like 'Titus' was. "What on earth kind of a name is that?"

"Jewish, isn't it?" Rev. Pollard said.

"My grandmother," Dr. Gedeon said. "And my father was a Santeria wizard from Bermuda. So I really don't fit in with your churchy stuff—though the

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building's absolutely gorgeous." She looked up at the stained glass windows.

The priest smiled with gentle pride. "All the original Art Moderne glass too—"

Titus wanted to laugh. "How did you ever become a doctor? A nigger, a Jew, and a woman!"

To his complete astonishment, Dr. Gedeon turned on her heel and slapped him across the face. He would have tumbled over if the priest had not caught him by the elbow. She continued turning, marching away out the door, her thick strange shoes plopping angrily against the stone floor. "Did I say something wrong?"

Rev. Pollard stared at him from under his grey eyebrows. "You were very rude."

"Was I?" The padre's cold disapproval whipped the blood to Titus's cheeks as a blow could not. I can't go back, Titus realized. The world he had known was gone forever, never to be found again. It had been a natural impulse but an utterly false step, to pursue familiar old things like this church service—to wind himself into a cocoon that resembled, more or less, the past. To retreat rather than advance was shameful, a coward's ploy. He had assumed the job was to retain what he had always been, the well-bred Edwardian soldier and explorer. Now he saw he had been pitchforked into a war, the scope of which made his heart sink: the war to make a life for himself in the year 2045, a fight he had no choice but to wage and win. "You're quite right," he almost gabbled in his haste. "I must beg her pardon."

He sprinted down the dim aisle, through the narthex and out into the summer sunshine, acutely aware that she was fleeter than he. If she had run beyond view, he would never be able to follow. He cursed his own helplessness, and grimly promised himself it should be short-lived. But there she was in the street, standing next to a big shiny-yellow beetle. "In you go," she said as he ran down the steps. "Let's go back to the TTD."

"In?" He realized it was a vehicle, a fantastically futuristic motor of some sort, and she was holding the door open. Awkwardly, he climbed in. She would have banged the door on him, but he kept it from latching and ducked his head through the window to grab her sleeve. "Doctor—Shell—I apologise. I'm not sure what I said wrong, but I'll do my best to learn. Please—give me a chance."

"The PTICA-TTD, at 93rd," she was saying to the driver. "Look, Titus, it's not your fault, I know. But even though you don't look it, you're a sexist, racist, anti-Semitic old fart! So let go my arm, okay?"

The grinning driver made a tasteless remark in what Titus recognized as Hindi. Automatically he flung the fellow a viperish oath picked up during his Indian service, and went on: "You can't send me back alone in this thing. I'll suffer from chronal displacement, just like Dr. Lash is afraid of. I'll have the blithering vapours. I'll get lost. I'll—I'll be robbed by the driver."

The cabdriver, cowed by amazement for the moment, seemed unlikely to do anything of the sort. But Dr. Gedeon sighed. "I suppose Kev would never let me forget it." She pulled the door open again.

Titus made room for her on the slick seat—plastic again. They must love the substance. And, God! "I'm sorry, I didn't ask if I could call you Shell," he said quickly.

"What?" Her grey eyes were blank with astonishment.

"It's an unwarranted liberty—isn't it?"

"Goodness, that's not important. I only assist Sabrina with your treatment, so we don't have a formal doctor-patient relationship. Keep on calling me Shell. Although I know it gives Kev a charge when you call him Dr. Lash, so maybe you should keep that up."

"I will. Shell, I'll find my feet as soon

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as I can—"

The vehicle lurched into sudden vehement motion and then screeched to a halt, flinging him against the sliding window that separated the driver from the passenger compartment. The driver turned, shrilling, "Careful! Son of a fool, hold onto the handle!"

Horns blared. Titus obeyed, cursing the driver comprehensively to the third generation. The seemingly solid handhold under his fingers suddenly gave way with an ominous click as some mechanism in the body of the door activated. The door swung perilously open out into unsupported space, taking him with it.

"No, Titus! Not that one!" Shell reached across him and pulled the door to. Titus got a terrifying glimpse of the roadway speeding past not a foot below, before she slammed the door shut.

The vehicle swerved wildly as the driver leaned on the horn while turning to abuse them. "You destroy my beautiful taxi!"

"Sorry!"

"Will you keep your eye on the road and drive!" Shell yelled at the driver. "And you, Titus, don't touch anything! Just sit!" She pushed him back into his place and with her other hand touched a button or control. A restraining strap slid out of a recess and clasped itself round his torso and waist, pinning him courteously but firmly to the seat. "My God, Kev will wet himself . . ."

The vehicle barreled along at an impossible pace, fast as a railway engine but darting in and out like a fish. Every moment new collisions and fresh disaster seemed imminent. Lights blinked in a blare of colour, metal hulls glittered like talons, and the traffic roared its hunger. Titus felt that dizzying disorientation creeping over him again. He licked his dry lips and clutched his hands together in his lap where Shell had placed them for safety. He stared at the turbaned back of the seething driver's head, reasoning away his discomfort. This driver is not a man of unusual gifts, he told himself. I've driven motors myself, just not as fast—and the road was empty! I could manage this vehicle. It can't be difficult, if a native can do it. I could learn. "You see why I *need* to learn," he said hardily. "As long as I don't know what's what, I'm a danger, to myself and others."

"You're preaching to the choir, Titus." Shell slumped against the seat in not-entirely-exaggerated exhaustion, her short blonde curls escaping from their headband. "You're going to need a minimum of information before you can even begin to learn. But give yourself some slack, okay? Take your time. The 21st century isn't going anywhere. We don't have to do it all today."

"You teach him," the driver snarled. "The fool, the idiot! He cause an accident to my taxi, I sue!"

"What is 'sue'?" Titus demanded of Shell. "It sounds like some hell-and-tommy impertinence!"

"I'll tell you later," Shell said. "Look, here we are, thank God! One more word out of you, driver, and I'll report you to the taxi commission. No, Titus, don't pull like that! Let me unbuckle it—oh, all right, unbuckle it yourself. You push this bit right here, and voilà. Yes, yes, here's your fare, and the hell with you, pal. That's right! and if you don't like the tip you can stuff it up your ass and set it afire."

Titus's mouth dropped open again. In all his wide travels, he had never heard such red-blooded invective from the lips of a female. A hard-bitten cavalry trooper could say no better. Torn between admiration and horror, Titus followed Shell inside.

Titus began the new regime the very next morning by stacking all the antique books back onto their cart, and rolling it out into the hallway. He wanted to add a label, the sort they put on steamer trunks: "Not wanted on voyage." He had learned everything he needed to

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know about the past. Onwards, to the present! He capped the gesture by demanding the morning paper. "You do still have newspapers?"

"Not *paper* papers," Dr. Lash said. "I mean, not usually printed on paper."

"What do they print them on then?"

"Screens, old man. Like this." He tipped the sleek little black machine he held, so that Titus could see the square glowing window on the front, small as a postcard. It looked nothing at all like what Titus would call a screen—screens were for fireplaces, to shield the glare. "And trust me, Titus—you would not understand a newspaper. It's too soon for you to dive into current affairs. Wouldn't it be easier to start with a précis of world history for the past century and a half? Work yourself up to the present day?"

Titus knew this was only common sense. Nevertheless he felt it was time to be bloody-minded. He had pretty well proven that he could do anything he set his will to. "I can do both. I know it."

"At least let me find you a paper newspaper," Dr. Lash pleaded. "We don't have to learn to surf the net today. Let me print out a paper edition of the *Times*."

"The *Times?* Truly?"

"The *New York Times*. But there's no reason why other papers shouldn't be available too."

"The only *Times* is the London *Times*," Titus growled. When Lash went out, he pulled a piece of paper from under his pillow. He had found it in the wastepaper basket of his bathroom—from the printing on the outside it must have once formed the wrapping for a roll of toilet tissue. Now Titus started his list on it. To 'plastic' and 'elevator' he now added 'screen' and 'net.' He was going to have to get a proper notebook, and a pen rather than a pencil. And no more of this keeling over like a stunned ox from swotting at the books. He would pace himself, sensibly.

Dr. Lash returned triumphant. "You're in luck, Titus! Jackie had last Sunday's *New York Times* printed for her son's history project. A couple days old should make no difference to you, eh?"

"I'll overlook the deficiency this time," Titus said with mock severity. He spread the weird undersized paper out on the counterpane. But within the hour he had to admit Dr. Lash was right. The *New York Times* was almost completely incomprehensible: not because any given word was beyond him, but because he had no context in which to place each sentence. What was the pork-barrel? If they were building a freeway, then it should be free—so why was funding it cause for vituperation? Who was the Internet AG, and how did his indictments combat Fortie frauds? It had been the same when he listened to Rev. Pollard's sermon yesterday. And the paper was too small and felt odd. Frustrated, he tossed it aside.

"Had enough, huh?" Shell came in with an armload of brightly-coloured books and magazines. "Maybe these will go down better. Kev's been buying up antique children's texts and reprints of old comics." She balanced the stack on the chair.

"Children's books? You must have a poor opinion of my intellect."

"Not at all. But you're not interested in scholarly analysis or minutiae. You want the broad overview—just enough to go on with till you find your feet. Did you know that to understand a written text you have to already know seventy percent of the words? Some TTD expert worked it all out that this level of difficulty should be about right for you now."

Not quite right, Titus noted. Not seventy percent of the words, but seventy percent of the *knowledge*. Grasping seventy percent of the meaning was the fence he was finding rather high. In any case the size of the stack was disheartening. "What I really want," he said boldly, "is another walk. Longer this time."

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"Sorry, Titus. I'm booked today, and so are you, with that reception this evening. Let me just give your vitals a check-over, okay? Sabrina is in consult all day today, so I promised her I'd do it."

"I don't want to over-work myself again with the books," he said, pressing his advantage. "Walking is good for me. You said so yourself."

"Oh, for God's sake." But she was smiling as she consulted the glowing screen of the little machine in her hand. "They didn't tell me you were persuasive. Tomorrow, how about."

"I shall look forward to it. Oh, and what is—" He consulted his list. "'Paticalar'?"

"Oh! The initials PTICA stand for Pan-Terran Interstellar Contact Agency. Everyone calls it the Fortie Project, though. This building you're in, everyone here, is the Time Travel Division, the TTD. And people who work for PTICA wind up being Paticalars. A silly name, but a newsie coined it in '39 and it stuck."

This was not very helpful, but Shell was obviously in a hurry to some other appointment, so he let her go. Instead he made a note of the names, PTICA and TTD. With the prospect of another outing comfortably in hand, Titus turned to the stack of books. He had never been of a scholarly turn. Now he found the large letterface and the shiny coloured pictures in A BOY'S BRITISH HISTORY soothing. King Arthur, William the Conqueror, Henry the Eighth—oh, yes. There will always be an England. It was disappointing that Scott and his Expedition didn't rate a chapter, but merely a paragraph. And good God, Baden-Powell's Boy Scouts project had flourished! Then wars and more wars—Titus groaned aloud. He had missed all the fun, curse it.

"Ask me any questions you like," Dr. Lash said, coming in.

Titus preferred to quiz Shell because she was less of a fuss, but it would be foolish to carry prejudice too far. "Lash, what is this Fortie business you're all on about?"

"You could say that the Forties are the reason you're here, old man. They're certainly the raison d'être for the entire PTICA-TTD."

"Then they're very important. Come then, tell!"

"I'm trying to choose the best way, Titus. Have you ever seen a film? A movie, a motion picture?"

"Of course," Titus snapped. "They took cinematographs of the Polar Expedition, you know."

"So then you think you'd be comfortable viewing an educational film?"

"About this Fortie business? Certainly!"

"Hmm, there's enough time." Titus noticed that Lash consulted not a pocket watch or a wristwatch, but his little machine. In 1912 a watch was the badge of competence and responsibility, yearned for in boyhood and carefully kept in later life, but obviously customs had altered. Instinctively he felt in his trouser pocket for the watch he always carried, the most accurate timekeeper in the Polar party, but it wasn't there. Lash was saying, "And it would be good if you had something to converse with the Ambassador about. But you're sure it won't be upsetting, Titus? There will be pictures of your rescue—"

The mere suggestion made his blood rise. "Don't coddle me, Lash. I insist on seeing this film."

"Well, let's risk it. While you get ready, Titus, let me give you a brief summary of the phenomenon. The first contact with extraterrestrial intelligence in 2015 set the world ablaze with excitement . . ."

Attending with only half an ear, Titus put on his shoes. He was rather ashamed that he'd fallen into this habit of tuning poor old Lash's blather right out, but at least Lash's self-importance blinded him to it. He led the way to the stairwell and briskly down the metal

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stairs while Lash trailed behind. Titus felt like a terrier straining at the leash, urging the slow-footed human along.

But instead of pushing through the big double glass doors, Dr. Lash turned the other way in the lobby. The single steel door he chose gave onto a plaza on the other side of the building. It was a fine hot day, blazing with sunshine, and beneath the shade of leafy trees were booths and stands and placards and bright-clad people. "A market," Titus hazarded. "Like in Egypt."

"Not a bad guess," Dr. Lash said. "But this is a marketplace of protesters and cranks, in the main. Better to let them have their say here, where PTICA has some control over the process. Ignore them all, old man. After the film, you'll know what's what."

The doctor linked an arm through his. Titus suppressed the impulse to pull free. The booths and placards did look beastly dull. Nothing edible or alive or interesting was on offer, but only leaflets. Titus remembered with brief nostalgia the teeming markets of Bombay. He had bought heavy silver bracelets for Lilian and Violet, and —

Dr. Lash suddenly stopped dead. "The brass-balled nerve of the fellow! No, this is too much! Titus, stand right here. Don't move an inch, all right? I'm just going to fetch the police."

"The police? I—" But Lash was gone, darting away through the press. Titus stood as instructed, and stared at the cause of Lash's ire. It looked like just another set of placards, presided over by a lean old man absurdly dressed in pale pink. The fellow was shouting some service or product and passing out leaflets.

"—safety for you and yours, when the aliens come," he said rapidly. "Condos burrowed into the rock on Easter Island, the most isolated place on earth." The people filtering through the plaza didn't pause to listen, even when the old coster thrust leaflets into their hands.

Titus's motionless stance made him very obvious. "How d'you do, sir?" the old fellow greeted him. "Here you are."

Titus took the offered leaflet. "What's it all in aid of then?"

"Don't ever trust what those PTICA people tell you, sir." His watery old eyes shone with sincerity. "What are they getting out of this? You think about that, sir, because you'll find it's the key to everything. They're all grinding their own axe. A secret agenda, do you understand me, sir? They don't have *our* interests at heart at all."

Titus wondered if he meant Shell or Dr. Lash. It came to him that this fellow was the first modern he had spoken to who wasn't involved in his rescue. But the old fellow was rattling on: "They tell us the Forties are too far away to be dangerous. But, come! Nobody knows what they're really after. Everybody agrees on that. Do you want to risk your family, sir, your children, on the unfounded assumption that they're nice folks? Safety first, that's my policy."

"And a damned craven one," Titus interjected.

The salesman evidently didn't know what 'craven' meant, because he didn't pause. "Easter Island, the most remote place on earth, that's where we're erecting the first series of shelters, sir. And construction is already beginning under the Antarctic ice cap—"

That one word was enough to galvanize Titus. "In Antarctica? Where's your base camp? Has the British government approved this incursion?"

"Britain?" The old man was momentarily derailed. "What do the Brits have to do with it?"

Conceding Amundsen's prior claim still stuck in Titus's craw, but in justice he had to add, "Or the Norwegians."

But suddenly the old man clapped his placard together, scooping up the stack of leaflets and shoving them into his pocket. Without a word more he began to scuttle away through the crowd. Titus heard a distant shout, "He's running for it!"

That was Lash's voice! Without think-

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ing about it, Titus lunged and clapped a strong hand onto the old man's shoulder. The placard went flying. The fellow squealed and writhed like a pig, no more than one would expect from a professed coward. "Let go!"

"Oh, buck up," Titus said in disgust. But, how odd—was that a fountain pen he was pulling out of his breast pocket?

Too fast for Titus's unaccustomed eye to take in, a pellet or stream or projectile shot from the pen's end, hitting a passing woman squarely in the stern. She whirled, teeth bared in outrage. "Tep!" she yelled.

A host of divergent irrelevancies instantly took charge of his thought processes, so that Titus stood there clutching the pink shoulder of his captive like a dummy. Perhaps 'tep' was a curse, his first modern swear word? The pen could not be a deadly weapon—the enraged female victim had taken no injury. What was she saying? It was too fast and impassioned for him to grasp, but she sounded damned stroppy. Perhaps the pen was like pistols, fairly harmless at a distance but dangerous up close. Not for the first time, it struck him that his ignorance was downright dangerous. The old blighter was pressing the thing up to his ribs. At point-blank range even a popgun might be annoying—

A huff of surprised breath escaped him. That hurt! Some sort of electrical shock, was it? A fiery pain had run from the pen right through his body. Without knowing how it had come about, he found he had let go and fallen reeling to one knee. A weapon, by Heaven, and surprisingly effective.

But the enraged woman was keeping the fellow at bay, yammering like all the Furies unleashed. Titus felt a new and profound sympathy for her attitude. Astonishing, how respect for grey hairs could evaporate under the stimulus of a low trick like that. He took the fellow's wrist in both hands and hauled himself upright, digging his thumbs hard into the tendons along the way and twisting the hand open. The little cylinder dropped clattering to the pavement, and the angry woman immediately snatched it up, snarling.

Sputtering, the old man took a swing at him with his other hand, but his arm was too short to connect. "An old cove like you shouldn't be so feisty," Titus observed sardonically. "Might you consider yourself overpowered? I'm a foot taller and two stone heavier than you, after all. And twenty years younger—" He bit the words off short. Not true, if one calculated by the birth date!

A pair of women in blue uniforms swept up on either side of him and collared the captive before Titus could say more. "Thank you, sir," one of them said to him in passing.

Dr. Lash trotted up panting, and dragged him aside. "I didn't mean *you*, Titus! Dear God, you shouldn't have waded in like that. It was very dangerous!"

"Stuff and nonsense—nobody was much hurt." He rubbed the place on his ribs where the tingling pain was passing off, and nodded at the agitated little group.

The old man drooped in the grasp of one female constable, while the other waved a black machine. The enraged woman had finally slowed to comprehensible speed, saying, "Damn right I'll press charges!"

Everything seemed to be under control. Reluctantly Titus allowed Lash to shepherd him away from the fuss. "What's it all about, then?"

"This is the fourth time we've caught this old fraud here, selling shelters against alien invasions."

"Under the Antarctic ice cap," Titus recalled.

"Is that the latest? Naturally there's nothing being built there. The scheme's fake as a wooden nickel. To have that sort of thing here gives the impression that *we* endorse it. Thank God nobody seems to have fallen for it today."

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None of this made sense to Titus. The familiar sense of overload was creeping over him again, triggered perhaps by the crowded plaza and its excitements. He trailed after Dr. Lash, masking his discomfort behind a cavalryman's reserve. Surely they were nearly there, wherever their destination was? They were approaching the building that formed the other side of the plaza now. Titus had to make a deliberate effort not to hurry up to its big glass doors.

Resolutely sauntering at Dr. Lash's heels, Titus had a perfect view of the portals swinging open at Lash's approach, without a hand laid to them. The wonder of it nearly cracked his mask, but he refused to demand how the mechanism worked right now. Later, perhaps.

Inside, the crowd was thicker yet, clustering at one end of the lobby. Titus was weakly grateful when Dr. Lash bypassed the crush, opening an inconspicuous door behind a pillar. Beyond was a vast dim space. "Mind your step!"

"It's a bleeding cliff." Titus peered over the railing.

"Not at all, there's a stairway to your left. Let's find a seat before the crowd comes in."

As his eyes adjusted, Titus realized it was not really so dark. Not until they were descending the stair did he grasp that these were seats forming the steep slope. This was a theatre, a very oddly-shaped one. He sat down in the seat Lash indicated. "But where's the stage? The curtain?"

"This is a *film* theater, Titus." Lash dropped into the seat beside him.

"Film theatres need curtains too," Titus grumbled. But the crowd was filtering in now, entering from the lower doors. And a bunch of trippers they were, too—children with jujubes, women carrying big bags or sniveling tots, men sipping from cups. It was like an outing to Bournemouth. A long time seemed to drag by, before everyone took their place.

There seemed to be no screen, but only a smooth blank wall, six storeys high. The seating sloped steeply enough so that every member of the audience had an unobstructed view. The lights faded slowly to a pitch dark, filled only with the anticipatory rustle of the crowd, the crackle of candy wrappers, and the whimper of a baby.

Violins, a swooping bit of romantic fluff by one of those German composers. A small spot of light appeared in the darkness, so small that Titus almost mistook it for a trick of his eyes. With a sudden swoosh the spot grew into a familiar blue globe. "What's all the cotton-wool round it, though?"

Titus felt rather than saw Lash's glance. "Clouds. That isn't a model, Titus. It's a motion picture of the Earth itself, taken from a satellite."

Questions surged up in Titus's chest: How did they loft anything so high? Who was running the camera? Since when did they take pictures in colour? But the entire wall suddenly exploded into light and life, and it was as if he were hurtling in a taxi driven by that Hindu again. The Earth whizzed by, six storeys high and tipping alarmingly until his stomach heaved. He gripped the arms of the seat and swallowed down the bile. It's only a blistering film, he reminded himself. This speed and size—it's a deliberate effect, damn them.

A voice spoke and made him jump. So they had learned to add sound to the moving pictures, the clever little buggers! Why had no one done it in 1912? But he wasn't going to give way to distraction. He forced himself to put amazement aside for the moment, and pay attention strictly to what was being said.

". . . LN-GRO, the most powerful gamma-ray space telescope in existence," the voice was saying. "The pulsar is a natural stellar phenomenon modified by alien intelligences to carry a message, transmitted in a series of gamma ray bursts. The message was enormously

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long, taking three years to capture in its entirety. It took another ten years to translate it."

Incomprehensible patterns of light and dark squares, moving back to reveal that they were merely depictions upon screens, the glowing rectangular screens of machines like those Shell and Lash used. Then the image moved back yet again, to show people sitting and standing at those machines, puzzling over the patterns. An instant soundless dissolution, and the huge image split into nine images—some of them continuing to depict scientists staring at screens, and others showing things Titus could not name, machines working or people doing things. For a moment he was totally at sea.

The music buzzed, busy and driving and joyous, giving Titus the clue he needed. He blinked with tardy understanding. The film was depicting a process: thought, research, the work of many people all driving towards a solution to the translation problem. He had never thought of telling a history in this way, but he dimly perceived the power of it. If only he knew more of what was being shown! To his astonishment, the film's voice intoned, "A minimum of information is necessary for comprehension to even begin." Shell had told him the same thing. It must be a proverb of the era.

But the film was going on about the mysterious star message, the possible interpretations of the signals and the final conclusion as to what they meant: "An invitation?" Titus muttered. "Someone in the stars wants us to come to tea, perhaps."

"Shh," Dr. Lash whispered. "Watch, they'll explain."

"—an invitation, and perhaps the means to get there," the voice said. "Albert Einstein told us that it was impossible to travel at the speed of light. But the Forties' novel theories of space and time have showed us how to warp space—and time. Their clues have helped us make theory into reality, and build a faster-than-light interstellar drive. The final proof was pulling a historical figure from the past to the present. This personage was carefully chosen from a spot where nothing was alive: on the Antarctic icepack, to ensure that not even an insect or a plant seed was inadvertently removed from the biosphere loop. Precisely placed in space and time on the 80th parallel on March 16th, 1912, his body has never been found. The bodies of his companions are still entombed in the glacier which will carry them out to their final ocean resting place in another hundred years, so that no question arises of some plant or algae being deprived of the nourishment of his component atoms . . ."

It was a single image now, of this door into the past shining with weird white light. Titus stared in jaw-dropping horror at the colossal screen. It was himself up there six storeys tall, falling through that door, the Rock of Ages cleft from the other side: the slow endless drop into blank whiteness. And not his clean whole current self, but the emaciated and gangrened cripple, stiffly clad in frozen mitts and tattered windproof, collapsed forward out of the glowing portal onto the gleaming white floor in a flurry of blizzard-driven snow. Chunks of ice, or perhaps bits of his frozen flesh, shattered off to melt into brownish disgusting puddles. The researchers in the film cheered loud and long, clapping each other on the back at this living proof of their theories. Dr. Trask and a horde of other medicos armoured in gloves and masks dashed forward to the rescue, turning the icy dying thing over, their shining tools poised.

Titus gazed up at his own face sideways on the screen. Several tots in the audience wailed at the horrific sight. The frozen white lips had writhed back, revealing a red-black slice of rotting gums and bloody teeth. Scarred with frostbite, the skin blackened by the

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wind and pocked with scurvy pustules, the countenance was inert and deformed as an Egyptian mummy's. The back of Titus's nose and throat constricted at a powerful memory of the nauseating aroma, the overwhelming rotten-sweet stench of his own body shivering into decay around him as he dragged himself along. "God, I shall be sick," he gulped.

"I beg your pardon?"

Titus lurched to his feet. He had to get out of here, before the bubble of vomit rose to the top. He almost fell down the stair, his leaden feet catching on the carpet, trapped in a nightmarish slowness. Above him the music blared triumph and joy, and the film's voice boomed, ". . . Captain Lawrence Oates, heroic explorer lost in Antarctica . . ." And where was the blasted door?

He pushed through and fell flat gasping onto the carpet. Dr. Lash, close behind, nearly tripped over him. "Hang on, Titus, I'm paging the doctors. Don't try to move!"

Of course this was intolerable. Titus immediately sat up, breathing hard. He wiped his clammy forehead on his sleeve. "Oh God. Oh bloody fucking hell. Lash—that was I!"

"But you knew that, Titus. I told you, it would explain all about your journey here."

"I don't understand. I do not understand." With self-contempt Titus listened to the weakness, almost the whimper, in his own words. Was he actually unable to grasp the knowledge offered to him, the way a dog is unable to manipulate a pencil? Were these people so far beyond him? Seventy percent, they said. Get 70 percent by the throat, and the rest will come. He reeled to his feet and walked, staggering a little, ignoring Lash's protests. He was a soldier, and a soldier could not give in. This was the true war, the one he was going to have to fight for the rest of his life: the battle to adapt and understand and survive here. No surrender, damn it. Never!

The lobby was thronged. Faces swam and spun past him, busy and self-absorbed. Thank Heaven people were unlikely to recognize him, thawed out, cleaned, and healed as he was now. Moving, using his arms and legs even in blind purposelessness, was the solution he instinctively clung to. The creed in the Antarctic was, if a man could walk, he could live. And it did not fail him. His stomach steadied and his courage returned a little. When a familiar quacking blatted out as he passed, he turned to look.

It was a duck call, just as he'd thought. A very young black man was blowing on the short wooden tube for the benefit of a gaggle of children, and making a damned poor job of it. The raspberry noise he made was embarrassing. "Now, what does this call say?" the young man asked them.

The only reply was giggling. Titus couldn't stand it. "Give me that." Without waiting for a reply he held his hand out over the heads of the seated children. Such was the power of his expectation that the young Negro meekly handed the duck call over. Was it done, to call them Negroes? In his day Titus had flouted class and race divisions not from any burning sense of the brotherhood of man, but in pure anarchic bloody-mindedness. The egalitarian quality of modern society caught him on the hop, as discomposing as kicking a huge weight that suddenly was no longer there. He held the little tube to his lips and blew. The call was not quite the same shape as the long thin ones he was used to, and there was something entirely novel about its innards. But it was not too odd, and he had been well-taught by the old gamekeeper at Gestingthorpe when he was a boy. A magnificent and utterly authentic-sounding quack echoed through the lobby, the cry of the mallard patriarch in his pond. Titus could almost see the ducks gliding in towards the water. His palms itched for his old fowling gun.

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"Oh, nice!" the young man said. "And what does it say, can anybody guess?"

"Hello!" "Or g'bye!"

"When a duck says quack, that's what it means, probably," the young man said. "But when *he* blows the call, what does he mean?" He pointed at Titus. "Sir, why do you say 'quack'? What do you want?"

Titus handed the duck call back. "Roast duck for dinner."

The black man beamed at his audience. "So we might know what the Forties are *saying*, but we might not know what they actually intend, you get what I mean? If the ducks knew that this gentleman was a hungry hunter they wouldn't come when he calls ..."

A boxful of noisemakers, animal calls, and other toys had been passed round the group, and the nippers seized this moment to try them all out at once. Wincing at the cacophony, Titus moved off. He saw now that the lobby of the building was fitted out with a series of displays and exhibits. How slack of him, to have come in earlier without noticing!

Titus halted to stare without comprehension at a spidery metal erection taller than he was. It was asymmetric and gawky, a derrick adorned with shiny rectangular boxes and flaps and the odd white plastic plate here and there. "A model of the trans-solar gamma ray satellite," Dr. Lash said at his elbow.

Putting the pieces together was like assembling a jig-saw puzzle cut out of granite. No wonder they'd chosen children's books for him. "The satellite received the message," Titus said slowly. "The message from somebody out in space, in what's-the-place."

"Tau Ceti. That's the name of the star system. Yes, it was the newsies that dubbed the aliens the Forties—because the gamma-ray source was numbered 4T 0091, you know."

Titus didn't know, but wasn't going to say so. He strolled on towards the next exhibit, which was made up of black boxes stacked in tiers around rows of chairs. All the chairs were occupied by rapt people, but someone stood up to leave and Lash nudged him forward. As Titus took his place in the semicircle of boxes, the sound enveloped him—a thump or pulse or syncopation. He looked up, and on a large screen directly above their heads was colour, washes of colour throbbing from red to yellow and back again to blue. Neither sound nor picture made the least bit of sense, and Titus sat in mystification for several minutes before he noticed the words crawling past on the ceiling at the edge of the coloured lights. Admiring the ingenuity of the system prevented him from actually reading for another couple of minutes. How did they make the words creep right round in a circle? A cine-projector could only project in a straight line, could it not? Look as he would, he couldn't even spot the projector. But finally he was able to absorb what the words were saying. "So this is *it?* This is what the Forties sent, this light and sound? Coy little creatures, aren't they!"

"More precisely, this is one of the interpretations we've made of their binary signals," Dr. Lash said.

Titus could not imagine how an invitation could be extracted from this. Or advice on how to travel to Tau Ceti. But he remembered the film, how many thinkers laboured for years at it. What damned *smart* people these were! He felt both pride and an uneasy inadequacy.

In his world, courage had been the paramount virtue. Now the rules had changed, and he had a distinct sense that courage was well down on the list. Look at that leaflet chap out in the plaza, for instance. What did they value nowadays? Communication, perhaps—being able to talk to unknown star-beings, and children, and yes, even the occasional time-travelling Polar explorer. Suddenly he felt a feverish desire to get

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back to those books Shell had brought. He had a lot of catching up to do, no leisure to idle about with tourists. "Shall we go back now?"

"Had enough, eh? I don't blame you." Lash sighed with relief. It was only when they got outdoors that Titus saw the white vehicles waiting at the kerb flashing their red and yellow lights, and Dr. Trask hovering with a stretcher crew at her back. "I told you I was paging them," Lash defended himself when Titus glared at him. "It's our job to keep a close eye on you, old man."

In the tone of a nanny dangling a toy before a baby, Dr. Trask cooed, "A ride in the ambulance will do you good."

"I'm going to walk back," Titus told her, and strode off across the plaza. Lash, and all of them, meant him only good, Titus was sure. But the closeness of their care, the modern obsession with safety and security, weighed on him like chains. He remembered now that Shell had mentioned he was closely observed. Even now Lash was trotting behind, blathering.

"Are you still watching me somehow, Lash?" Titus interrupted him. "I won't have it!"

Dr. Lash frowned. "Shell is such a chatterbox, I'm ashamed for her. My boy, you've only returned to the land of the living for a couple days. It's our job to keep a close eye on you. This is, count them, your fourth day of waking life in the 21st century. Be reasonable!"

Titus could not deny it. But he could refuse to concede defeat. He stalked tight-lipped into their own building, Lash panting behind like an overweight lap dog. "The elevator for me," he wheezed. "How about it, Titus?"

"Instead of the stairs? A pleasure." Titus thawed instantly at the prospect of being initiated into yet another modern mystery. Tall panels slid aside, revealing themselves to be doors. The room beyond was very small. "Nowhere to sit," he remarked as he followed Lash in.

"We'll only be in here for moments," Dr. Lash said. "Thirty-nine," he added, mysteriously. Titus noticed that the discreet digits 39 lit up in blue on a wall panel a moment after Lash's spoken words. The metal doors slid shut, and only the discreet murmur of an engine betrayed any motion. When the doors opened, a disembodied voice made him start by sweetly announcing, "Thirty-nine." So machines these days could talk and be talked to! And there was the familiar corridor with the door of his own chamber standing ajar at the far end.

"Delightful," Titus admitted. "Better by far than hauling up all those stairs. But what's this?"

"Hi, Titus!" Dr. Trask popped out from a room just behind. The anticipatory gleam in her sea-blue eyes would make a cavalry brigade falter. "Did I mention that an ambulance ride would be faster, too? Just step in here for a moment—I left an entire surgical board meeting just for you." She held her stethoscope up.

"I'm fine! Lash, call these harpies off!"

At his other elbow Shell said, "Harpies? I'm hurt, Titus. Is that nice? I thought you were going to learn modern manners." He babbled apologies until he saw the twinkle in her eye and realized she was jesting. By then they had him jockeyed onto the examination table, tapping and probing with their shiny tools.

He made an effort to be gracious. "I quite appreciate the work you've put into my restoration. I very much enjoy having use of my limbs. But the job is finished! I'm in good nick. There's nothing wrong with me now."

"I don't like these spells of dizziness," Dr. Trask said. "But on the whole, we've made a fine job of you, Titus." She beamed at him with pride, the way one might admire a prize steer.

Titus held his commentary until they let him go. Then he snarled to Lash, "Don't I get any credit for my own sodding health? She makes me sound like a house pet."

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"She made a *spectacular* job of you, old man," Lash said. "I could show you the film—they cloned bits of you and reattached them, extracted samples of diseases of your time and inoculated you against modern ones—"

"Film? There's another damned cinematograph?" Titus was aghast.

"Of course there are complete records. Titus, not only are you an important historical figure. You're the first time traveler, probably the last to—"

Titus could imagine the pictures six storeys high of himself in the altogether, being patched together and reassembled by Dr. Trask and her team. Had he a scrap of privacy left? Seething, he flung himself into his chair, picking a book up at random and pretending to be absorbed in it until Lash went away.

As his anger faded however Titus was drawn into the book. It was something he had never seen before, a story told in pictures and labels, something like Hogarth engravings but more colourful. He turned back to the title page: BUCK ROGERS: THE FIRST 60 YEARS IN THE 25th CENTURY. He gathered from the foreword that these things were called comic strips. At first he could not imagine why Dr. Lash had selected this for him. But when he began at the beginning he understood. This Buck Rogers fellow was a soldier who had travelled into the future too! The discovery made him chuckle. And how clever of Lash's cohorts, to take an idea from a children's book and make it reality!

And the comics themselves were ripping in a juvenile sort of way—evil Asiatics kidnapping shapely blonde girls, battles across land and sea. They were the sort of fare his boyhood chums at Eton would have thoroughly enjoyed. He whiled the afternoon away very pleasantly.

"Titus, old man," Dr. Lash came in to say. "Time for dinner—the banquet, you remember. Would you care to dress?"

"A bean-feast? Nonsense. I don't know a soul in this world, except you and the other doctors."

"Titus, we haven't discussed this much," Dr. Lash said. "But think about it. You are famous, the first time traveler. Furthermore, you're the quintessential British hero, an historical figure. Naturally people are interested in you. Now that you're on your feet again, let us show you off a little."

"Claptrap!" But Titus noticed Lash's nervy air as he laid out new garments on the foot of the bed. Perhaps it would be letting down the side, not to indulge him. "So what's this then? Can't I wear the trousers I have on now? They fit well enough."

"These will too. They're the same size, just a more dressy cut."

"What has the world come to," Titus grumbled, dressing, "when khaki can be spoken in the same sentence as dressy?" None of the garments were what he would have chosen for himself, these ill-tailored trousers and the nasty coarse shirt and unnaturally sheer socks. Everything fitted well enough but felt tatty and fake, like stage costume. He would have spurned a necktie, but none was offered. Only the wool jacket was tolerable, though its blue was a hair too assertive. "But I know—knew, I should say—a tailor in Mhow who could make a far better job of it."

"I'm afraid that, after technological advances, the changes in dress will be the most trying for you," Dr. Lash said placatingly. "Yes, just step into those shoes. Now, this way . . ."

Titus was glad he had bathed and shaved this morning. In Antarctica while sledging nobody had had the strength to spare for personal hygiene. They had niffed like foxes after four months of brute physical work in the same clothes without bathing. He wondered who'd been handed the nauseating job of cutting him out of his polar clothes after the rescue, and hoped to blazes it had not been some female. That was probably where his watch had gone, too. But he could probably find

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out, damn them—it was all on film somewhere.

He followed Dr. Lash down the elevator, congratulating himself on how commonplace the ride already had become. They got out on an unfamiliar level. Beyond the elevator hallway was a large meeting room with nobody in it. "Good, the Secret Service finished their sweep," Lash said. "The President and the British Ambassador were anxious that the occasion be kept as casual as possible for you—"

"You mean the President of this country? Of the United States?"

"Yes, Titus, I was telling you. There'll be photographs and so on, but you're used to that, and also more video—film, moving pictures."

"Yes, yes." Titus recognized the experience now: codswallop, the sort of silly attention-grabbing that the nibs, nobs and snobs arranged to amuse themselves. Some things never changed. He regretted now not smuggling the BUCK ROGERS volume in.

But then the doors opened, and a horde of people came surging in. "Let me make some introductions," Dr. Lash said genially. "Titus, this is the TTD's Medical/Cultural Management Section, essentially everyone who works here in New York, mostly—Marjie's on vacation, and a couple of people are out sick . . ."

The faces and names blurred in Titus's mind as Lash presented them. Only Dr. Piotr, pinkly plump and overly well-groomed, seemed to be important. Titus gathered that he ran the entire show on the time-travel side. Everyone seemed hugely delighted to meet him, smiling and squeezing his hand with enthusiasm.

Sabrina Trask startled him speechless with her bright yellow trousers. Women wore trousers in this era! And though he had been too flustered to notice at the time, he dimly recalled now that females out in the street and in the museum had been similarly clad. Titus had not realized until now how clothing signaled status and sex. It was the sort of thing everyone instinctively knew in his time, though from pure hellishness he had occasionally amused himself by cocking a snook at the standard. Now he murmured inanities as the line passed, all the while trying to deduce the underlying principles of modern dress.

Trousers were obviously no longer confined to men, nor skirts to women—surely that fellow over there was not wearing a gown? Perhaps it was a robe of the kind worn by Hindus. Some men had beards, some were clean-shaven like Lash, and there were plenty of thick mustaches like his father had favoured when Victoria was Queen. Was hair the key? This one with hair nearly as long as Sabrina's must be male from his beard, yet right behind him was another chap shorn to quarter-inch stubble. In his day all women had long hair, but there was Shell with her boyish curly crop, and Lord! Here was a woman absolutely bald! Titus opened his mouth as he shook her hand, but no words came out. Lash had warned him that the sartorial fence was going to be a high one—perhaps it was not necessary to clear it today!

Even the women in skirts didn't walk like ladies any more, with the delicate slow saunter enforced by tight corsetry. They walked like men, brash and bold. And the thrill of glimpsing a well-turned ankle was gone, when a man could see all the way up to well above the knees. In his day even the shilling dockside Gerties were not so bold! Yet it passed belief that so many bits of muslin would be presented to the swells, and there was no lasciviousness in their manner or faces. He was forced to conclude that all the women he'd met in the 21st century must be respectable after all. The lewd signals sent by their clothing were to be ignored. He thrust the confusion aside to think about later.

Last in line, Shell was gowned in elec-

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tric blue—were there no *sober* colours in this time?—and vibrating with nerves until her earrings jingled. "I hate this, don't you?"

He nodded in fervent agreement. "Like a cursed dog show." No hats and no watches, Titus concluded, but without exception everyone carried or wore a little machine. Perhaps they were the modern equivalent? He shoved his hands into his pockets to hide his lack.

Everyone stood in loose rows, like troops being reviewed only much more casual, Lash and Dr. Piotr flanking Titus. Titus suddenly noticed the buffet tables laid out at the far end of the room. Dinner! Though the body had been restored, yet the mind still lived in the posture of starvation. His stomach gurgled audibly, and he crossed his arms over it in embarrassment.

But there, thank God, was a stir at the door, and a number of new people came in. Only a few of them came forward to be greeted by Dr. Piotr. "Madam President, may I present Captain Lawrence Edward Grace Oates. Titus, this is President Livia Hamilton."

In a slight daze Titus shook the President's hand. He would have placed her as the headmistress of a dame's school, with that firm mouth and pinned-up grey hair. Had American presidents ever been women in his time? He could not recall, but rather doubted it. "This is an honor," the President said in a deep horsy voice. "Captain, welcome to the 21st century."

"Thank you."

His concise reply seemed to disconcert them. Dr. Lash said, "And this is the British Ambassador, Sir Harold Burney."

More handshaking. "Sir," Titus acknowledged. Dr. Lash bobbed his head in an encouraging manner, but Titus was damned if he was going to bark on command like a trained seal.

"On behalf of His Majesty the King, I welcome you back to the land of the living," the Ambassador said.

How fine it was to hear a British accent! But, "His Majesty?" Titus demanded, startled. Surely King George V was not still alive?

"Oh! His Majesty King William I. You poor fellow, haven't they caught you up to date yet?"

"In due course, sir," Dr. Lash broke in. "We've tried to bring the Captain up to speed gently. It's a big adjustment to make."

The Ambassador beamed with pride. "But if I know anything about it, you've been damned plucky, eh?"

"Not at all." Titus remembered now that this was why he loathed Society—one had to *converse*. Every anarchic instinct in him rebelled at the expectation. He was tired of being a tame poodle. "What I want to know," he began, in his plummiest drawl.

"Yes, yes?"

Titus pinned the Ambassador firmly with his gaze. "I wondered why a pack of Yanks are making these great discoveries. I get the distinct sense that Britain's no longer in the forefront of human endeavour."

The Ambassador turned pink and opened his mouth, but only a few disjoint syllables came out. "Shameful backsliding, I call it," Titus pursued, twisting the knife a little. "The work we put into keeping the Empire on top of things, fighting the Boers, trekking into the hinterlands of the globe, and now look at it!"

Dr. Lash's grip on his elbow was almost painful as he swiveled Titus back to face the President.

"So, Captain," the President said. "Now that your life has been restored to you by Dr. Piotr and these good folks, what do you intend to do?"

"There's a facer," Titus said, at a loss. The question had not occurred to him till now. Which just showed how pulled down he was, since it was obviously of the first importance. "Something useful."

"A fine idea."

"I don't suppose Britain's at war or

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anything," Titus said with dissatisfaction. "Perhaps we could try and claim the Colonies again, eh?"

The President's smile did not waver, but her gaze flickered, searching for rescue. The British Ambassador hastily said, "No wars on at the moment—but your old regiment, the Royal Inniskilling Dragoon Guards, is anxious to welcome you back into the ranks."

Titus had kicked his heels in an idle peacetime regiment before—codswallop, pointless parades, catering to the whims of the brass—and was not about to take the shilling for more. "Perhaps I could work at the TTD here," he said. "Lend a hand with the time-traveling business. I have the experience, after all."

The Ambassador gave a small polite laugh. "Oh, very good."

The President glanced at Dr. Piotr. "You planning another jaunt into the past, Doctor?"

"Not soon," Dr. Piotr said. "And not another person. Captain Oates here is probably the one and only man who will ever travel through time, because that's a dangerous trick to try. But by plucking him out of the past we have more than just the proof of the fundamental theories. It was a test of the Fortie technology. They taught us how to build a drive that can twist space—or time. This was the easy part. The captain is living proof that the time travel works. Next, we test the technology on the main job: travelling to the stars."

Titus listened closely, sifting nuggets of meaning out of the incomprehensible. "Do I understand you correctly?" he cut in, interrupting Dr. Piotr in mid-peroration. "You didn't set out to travel through time? You didn't intend to rescue me?"

The scientist cast a pained glance at Dr. Lash, who said, "But, Titus! I explained this to you. And the film this morning discussed it in detail!"

"This is the Fortie project, Captain," Dr. Piotr said patiently. "Your rescue was part of it."

"Ah, you took him over to the museum, very good," the Ambassador said. "I love IMAX films myself, ever since I saw 'To Fly' down at the Air and Space Museum when I was a wee lad."

For a moment Titus was speechless. No one had said that he was the sole beneficiary of a titanic temporal rescue effort. He had only assumed his was the central role. Apparently he wasn't the pivot of the project: had never been. He was an unimportant cog in a big engine that was driving across the heavens towards Tau Ceti. The readjustment in his picture of the situation was painful but nearly instantaneous. He had never been one of those status-conscious blokes, always trying to get an edge on his fellows. He had enough self-confidence to speak up right away: "Right-oh. Count me in then. I've never been to another planet! When do we leave?"

Embarrassment, shuffling feet, a nervous laugh. Had he said something wrong?

"Now isn't that just the spirit of exploration," the President said, with the air of a schoolteacher determined to find something positive to say about a rowdy pupil. "You're a firecracker, Captain. Larger than life!"

"A credit to the nation," the Ambassador said. "Ah, sherry!"

An overall relaxation, as trays of drinks circulated and people began to move towards the buffet. Titus seized a glass of sherry and hung back as the nobs went forward. "Monster," Dr. Trask whispered, grinning. "So this is how Victor von Frankenstein felt!"

"You're a troublemaker, Titus," Shell agreed. "You've got your nerve, jerking the poor Ambassador's chain like that. I thought I'd bust a gut."

Titus refused to be distracted, even by the spread of food. "I like the idea of going to Tau Ceti. Who else is going? You, Lash?"

Dr. Trask snickered at the idea. "Not with his asthma! And you're never get-

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ting me up in one of those things. Clonal surgeons have plenty of work Earthside, grafting new limbs and boobs and organs onto people. Shell's the one who'll sweep those Forties off their feet."

Titus blinked. He had not meant to suggest that women could be explorers. "If they *have* feet," someone else in the line remarked.

Shell sipped her sherry and laughed. "Did you see that awful cartoon on the Today page?"

"Well, prophylactics wouldn't take up all that much cargo space!"

The talk veered off into jokes and chatter that went right over Titus's head. "It sounds like a perfect job for me," he grumbled, accepting the plate someone handed him. What an odd and casual way to eat—and they called this a banquet? To Titus, banquets meant waiters and service, not shuffling through a line for bangers and mash.

Dr. Trask plopped a scoop of potatoes onto her plate and said, very kindly, "Titus, the teams have been in training for ten years. It'd be an awful lot of work for you to get up to speed."

"Frankly, old man, you were the highest example of the explorer as amateur," Dr. Lash said. "But this is the age of the professional. It's no reflection on your own worth."

In fact Titus did not believe this. His entire experience, leavened with the example of Buck Rogers in the 25th century, assured him that all he had to do was try. Surely a concerted effort would bring success. He helped himself to an enormous plateful of food, only belatedly noticing that he had cleared off half the sausages. How odd, that meat should make up such a small fraction of the offerings! But he had always been a carnivore, and it would surely be incorrect to shovel part of his portion back onto the platter. Instead he allowed them to seat him at the head table.

The President had asked Dr. Piotr a question about the economic impact of speedy space travel, and the talkative scientist was off and away. "At FTL," he said with enthusiasm, "the planets are just suburbs. We can colonize the solar system! No more of this three-years-to-Mars stuff. We've already gained so much from this one Fortie contact, I can't wait to see what else is coming."

Every word was English, but Titus found he had no idea what was being said. He leaned nearer to Shell. "Do you understand him?"

"Sure."

"I don't."

She laughed. "And Piotr prides himself on being a populizer, too! Don't disappoint him by telling him."

"Hamilton's such a show-off," Sabrina Trask muttered from beyond Shell. "Just because she taught economics and math at Stanford."

Titus wasn't even sure what economics was. Something to do with money, he hazarded. Born to wealth, all he knew of money was how to spend it. He wondered what precisely Buck Rogers had lived on, and how he had got into the 25th century's military. "Shell, how much education have you had?"

"Me? Gosh, let me think—twelve years of school, four years college, medical school, another two for my communications doctorate . . . If you count the Fortie training, I've been in school just about all my life."

Dr. Piotr had finished his remarks, and the President applauded, saying, "Doctor, I swear if you ever want to quit the Paticalar business, I have a job for you in politics. You could sell shoes to snakes."

The doctor grinned, pinker than ever. "Once, Madam President, you might have tempted me. Now, I know the better part. This is where the fun is going to be."

"Gad, I envy you young people," the Ambassador said. "Tell us more about the time business—what's this new time window trick the newsies are chat-

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tering about?"

Obligingly, Dr. Piotr said, "Well, it's disruptive and difficult to pull a real object or person through time. A perfect candidate like the captain here is rare. It would be as much fun, and cheaper, to just pull light—images. I wouldn't mind a photograph of a velociraptor, would you? We could make a fortune on the posters and screensavers alone."

This is beyond me, Titus admitted silently. He bowed his head to the inevitable. Buck Rogers was a cheat, the invention of some fantasizing duffer who'd never actually had to work with less than seventy percent of the knowledge necessary. Titus would live the reality, and he could acknowledge now that much of it would be forever beyond his comprehension. To swallow down the entire 21st century was too big a mouthful. His only hope was to select an area to worry at and, please God, to master.

But which area? If he wasn't going to explore, then what? "Lash, what am I going to live on? They must have proved my will and settled the estate. I don't suppose my heirs' descendants, my great-grandnephews and so on, will want to part with the money even if there's a bean left after all this time. Will you people support me until I die?"

"A stipend's in the works," Dr. Lash said. "PTICA is responsible for your existence, Titus—you won't starve."

"But I bet anything you like, you're not going to want to live out your life as a couch potato," Shell added. "I can't wait to see what the newsies will say, about your reconquering the American Colonies!"

Dr. Lash shuddered. "I could wish, Titus, that you'd be more careful about what you say!"

Titus ate steadily, thinking hard. His life had been handed back to him on a platter. But the President, of all people, had put her finger on the key question: what could he do with it? He knew how to fight, and he knew how to die. He had a sense there was very little call for such skills in the 21st century. As useful as knowing how to blow a duck call, he thought sardonically. Perhaps he could assist that young black at the museum.

He had it now: enough information so that he could distinguish what was truly vital. Clear as day, Titus saw that if he didn't carve a niche for himself, he would indeed become a couch potato—he was repelled without even knowing what that was. There was a higher fence to clear than just learning to exist here. The crucial battle lay not in the past, nor the present, but the future. From infancy, playing with popguns and wooden horses, he had always known what he would be: a soldier. Now in this strange new world this destiny was gone, and he was adrift. He could do anything he set his will to. But first he had to find a new destiny to replace the one he'd left behind in 1912. Else he'd become a pet, a parasite, leeching off the moderns for the rest of his useless life, trotted out for display every now and then to bark for the visiting brass.

It reminded him of his first sight of the Himalayas, in India. Some dashed impressive mountains, but then the morning haze lifted for a moment, and

Judgment is not upon all occasions required, but discretion always is.

-Lord Chesterfield

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the eye took in the colossal heights beyond, snow-capped peaks rearing up to pierce the sky. What he had thought was the real battle had again been nothing but the first skirmish. How much easier a sharp crisis would be! Walking to one's end in a blizzard, perhaps. "May be some time," indeed! This slow stubborn uphill slog would last till his dying day—in the spirit of locking the barn door too late, he swore that when he drew that final breath it should not be expended on feeble ironies that would come back to haunt him.

Wars came to an end in a year or two. Even manhauling to the Pole and back had to be accomplished in six or seven months during the austral summer. But this was never going to end. It would call for more pluck and resolution and bottom than anything else he'd ever set hand to, because it would never be over. For a moment the prospect was unspeakably daunting, and he slumped over his empty plate. But with an effort he straightened. Stiff upper lip and all that. He had conclusively demonstrated, after all, that he could do anything he set his mind to. "I've survived far worse," he said aloud.

Dr. Lash glanced up. "What's that you say, Titus?"

No time like the present to begin. Titus gazed thoughtfully at the other man's little machine, lying beside his plate. "Lash . . . what time is it?" ■

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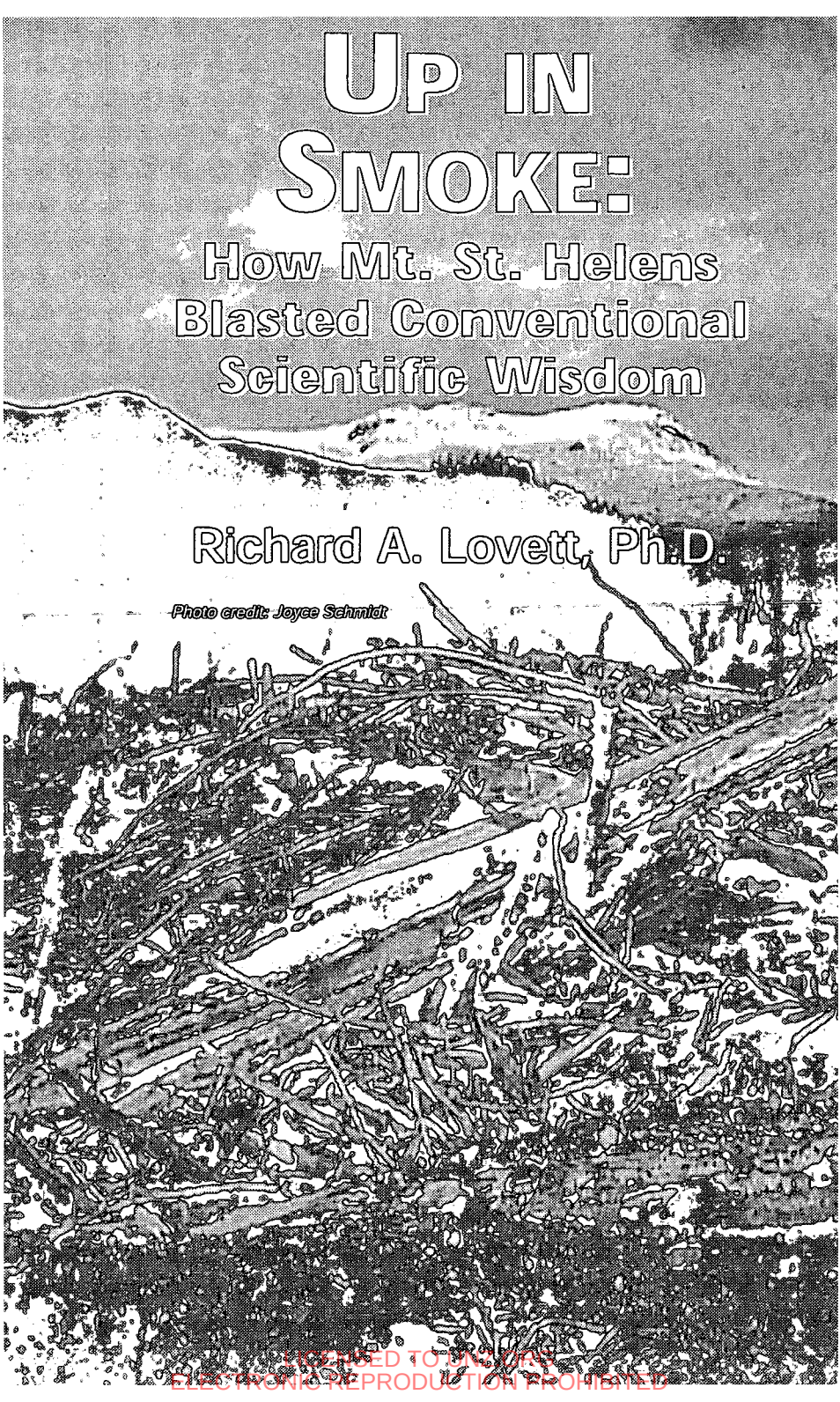
Up in Smoke:

How Mt. St. Helens Blasted Conventional Scientific Wisdom

Richard A. Lovett, Ph.D.



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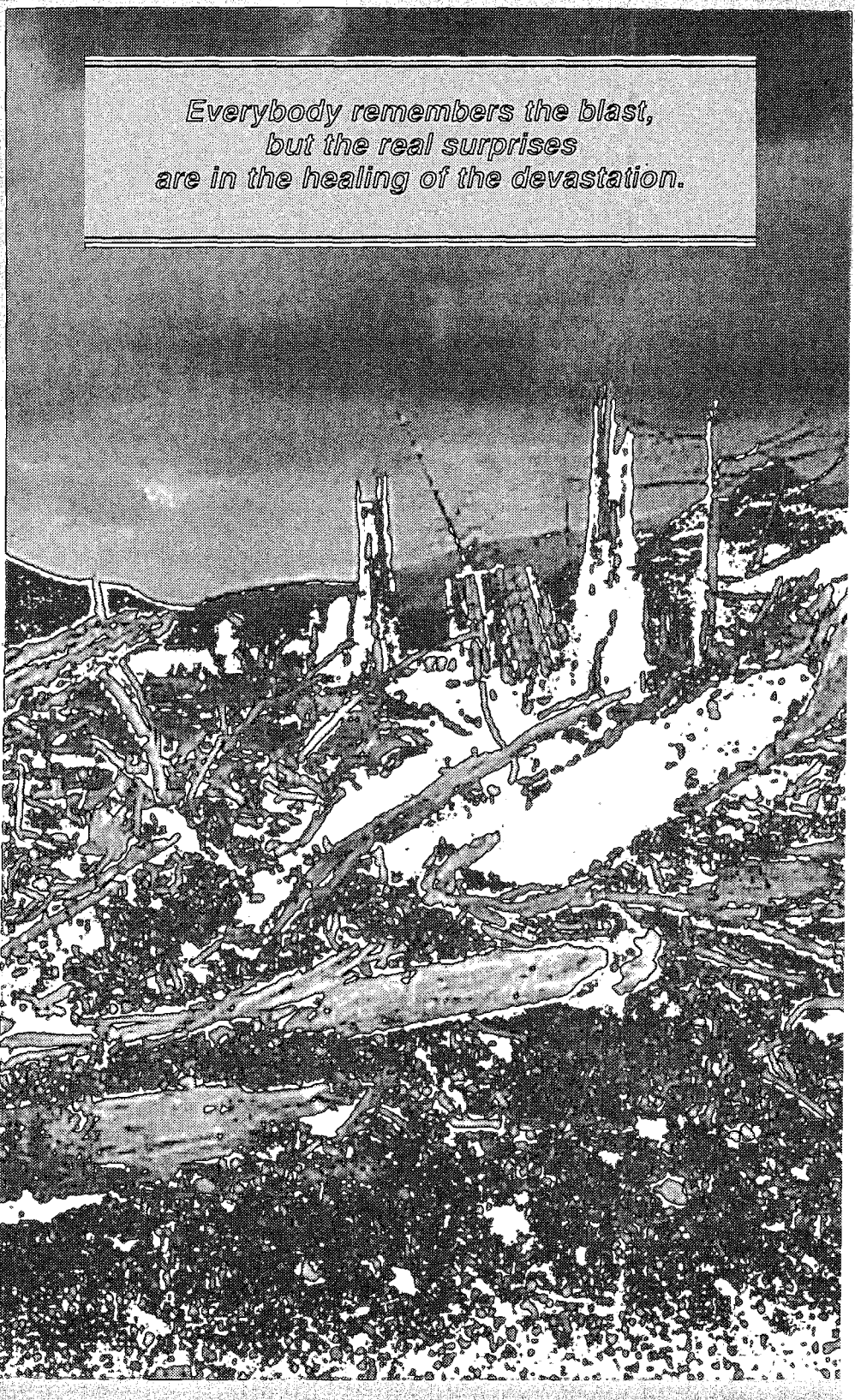

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Pacific Northwesterners complain that you can't trust the weather until after July 4. But from the photos, May 18, 1980, must have been the type of day that belies the region's drippy reputation. By 8:00 a.m., it was sunny in the southern Washington Cascades. Presumably, birds sang and snowmelt trickles merged into rivulets heading for lowland creeks—a perfect spring morning in the High Cascades.

But this morning was different. For weeks a previously little-known volcano had been stirring, and now it was preparing to catapult itself into the ranks of the world's most famous mountains. At 8:32 a.m., the upper slopes of Mt. St. Helens began to bulge sideways—like an artery about to pop an aneurysm or an automobile tire on the verge of a sidewall blowout. Then it happened: the mountain blew its top—not upwards, but sideways, in a blast that would lay waste to more than 150 square miles.

The first wave of devastation was a shock wave that has been described as a "stone wind." It roared down the mountainside at hundreds of miles an hour—several times the speed of a class V hurricane—hurtling rocks, toppling trees, and flaying the land to a lifeless-looking gray expanse—a moonscape as bleak as the world's harshest deserts. That was followed, in quick succession, by the largest avalanche in recorded history (comprised of nearly 0.6 cubic miles of rock), mudflows, scorching heat, and billowing ash that turned day to dusk at least 100 miles downwind.

But the blast did more than rearrange the landscape; its intellectual aftershocks reordered scientific wisdom in two fields, vulcanology and successional ecology. The changes are so wide-sweeping that scientific historians could easily divide both fields into pre- and post-Mt. St. Helens eras.

Jules Verne's *Journey to the Center of the Earth* aside, relatively few science fiction stories draw heavily on vulcanology. But the blast rendered obsolete the scientific underpinnings of science fiction stories that meticulously constructed viable-seeming worlds based on pre-Mt. St. Helens notions of ecology. Terraforming and post-apocalyptic stories may also have to be reconsidered. And Mt. St. Helens' lessons on the effect of what ecologists euphemistically call "perturbances" are important to the design of multi-generation "universe" ships that substitute self-contained ecosystems for the need to carry hundreds or thousands of years of supplies.[1] These same lessons also offer possible explanations for why one actual attempt to create such an ecosystem, the Biosphere project of the early 1990s, was such a miserable failure.[2]

Although the chief implications for science fiction are likely to be in the realm of ecology, Mt. St. Helens has greatly broadened scientists' understanding of volcanic hazards. Let's look first at vulcanology, then turn to some of the ecologists' more dramatic findings.

St. Helens, East of Yakima[3]

There's nothing like a catastrophe to

[1] The term "universe ship" is drawn from the Robert A Heinlein story "Universe" in which the inhabitants of such a vessel had been aboard it for so many generations they had forgotten there was anything outside.

[2] The Biosphere was a 3.15-acre sealed dome with a self-contained ecology that was expected to support eight "bionauts" for a two-year experiment from 1991-93. The ecosystem quickly went out of balance, however, going so haywire that the bionauts eventually had to give up. Had it been a spaceship, where walking out the door wouldn't have been an option, they'd have been in real trouble. As it was, it was an expensive lesson in the difficulties of creating a balanced ecosystem in a closed environment. The dome, which is in Oracle, Arizona (on the outskirts of Tucson) is open for tours, and the associated facilities have evolved into a scientific research institute. For more information, see www.bio2.edu.

[3] With apologies to the 1969 movie *Krakatoa, East of Java*. The geographically sophisticated may protest that St. Helens is west of Yakima—but so, too, was Krakatoa *west* of Java. But hey, if Hollywood usually can't get science fiction right, why should geography fare any better? "Kratatau," incidentally, is the preferred

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remind people that *terra firma* isn't always *firma*. The first worldwide look at volcanoes was spurred by two events, the 1883 eruption of Indonesia's Krakatau (36,000 dead), and the 1902 eruption of Martinique's Mt. Pelee (30,000 dead). Now, Mt. St. Helens is the volcano of the moment—so much so that a recently completed encyclopedia of vulcanology presents it as the "type" example for at least 30 of its 82 topics.[4]

Lessons from Mt. St. Helens have simultaneously unlocked keys to the geological past and helped geologists fine-tune their ability to issue warnings for the future. Prior to the eruption, for example, vast debris avalanches such as the one that roared off Mt. St. Helens were thought to be rare. Not that deadly rockslides were unheard of—on May 21, 1792, one spilled into a bay in Japan, generating a tsunami that killed 15,000 people—but even that hadn't been on a scale comparable to the Mt. St. Helens slide.

Then geologists got their first good look at the aftermath on Mt. St. Helens. They found that large chunks of the upper mountain had floated atop the landslide like rafts on a storm-tossed sea. Where they came to rest, the result was a bizarre, hummocky landscape, with the blown-out wall of the crater looming above like an enormous amphitheater. Geologists immediately recognized this as a type of terrain that had been observed at the base of numerous other volcanoes. Nobody had previously figured out what created these lumpy landscapes, but now vulcanologists realized they were signatures of huge rockslides, signs that substantial portions of a volcano had loosened and *flowed* like vast, destructive torrents of rock.

Geologists have now identified the remains of more than 400 such slides, some on a scale that would dwarf the one on Mt. St. Helens.[5] A 350,000-year-old slide on the north side of California's Mt. Shasta, for example, buried an expanse of 450 square miles—nearly three times the area hit by Mt. St. Helens.

The landslide was only one of the lessons Mt. St. Helens had to teach. During the eruption, geologists were able to use a host of techniques, including satellite photos, to track the ash plume more accurately than had ever been done before—useful for making predictions for other troublesome volcanoes such as Mt. Pinatubo in the Philippines. Although such plumes are the least deadly of volcanic perils, they are a threat to airplanes, whose engines can be overheated by the abrasive ash.

The ashfall studies can also help scientists figure out the size and intensity of prehistoric eruptions. "We can go to the most famous of them all, Mt. Vesuvius, and reconstruct the eruption that covered Pompeii," said University of Oregon geologist Kathy Cashman at a recent symposium convened in honor of the Mt. St. Helens eruption's twentieth anniversary.[6] That's not only of interest to historians, but it can also help minimize future risks.

Geologists also picked up valuable information from the enormous mudflows created by the fall of hot ash on the mountain's glaciers and snowfields. Within minutes of the start of the eruption, huge quantities of mud were in motion, sluicing down the Toutle River to destroy 200 homes and clog the barge channel on the Columbia River, more than 100 miles downstream.

Mt. St. Helens' original mudflow was stunning mostly for its magnitude. Subsequent, smaller eruptions during the next few years taught that it doesn't take

[4] Haraldur Sigurdsson, Bruce Houghton, Stephen R. McNutt, Hazel Rymer, and John Stix, *Encyclopedia of Volcanoes*. Academic Press. 1999 ($99.95).

[5] "Mount St. Helens, Master Teacher," Christopher Newhall, *Science*, Vol. 288, 19 May 2000, p. 1181-82.

[6] Mount St. Helens: 20 Years of Biological Research and Lessons Learned, May 13, 2000, at Mount St. Helens National Volcanic Monument.

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much volcanic activity to set loose a devastating torrent. In 1982, a small eruption occurred while Mt. St. Helens' crater was still full of snow, flushing downriver with sufficient force to remove sediment retention dams all the way down the Toutle.

In 1985, geologists drew on this lesson to issue warnings about a similar eruption on Novado del Ruiz, a tall, snow-capped volcano in Colombia. The warning was badly disseminated (or not heeded), and the eruption, although "minor" in the terminology of vulcanologists, produced a mudflow that killed 25,000 people.

But some of the most valuable predictive research came from studies of the lava dome, which began forming in late 1980, and had reached a height of more than 900 feet by the time activity ceased in 1986.

Lava dome eruptions are the world's most common. They're potentially dangerous if the dome forms on a steep slope where it is subject to collapse, as happened in 1996 in Montserrat. But before Mt. St. Helens gave vulcanologists a chance for up-close study of the sequence of 17 eruptions that created its dome, geologists had no ability to predict such events with any accuracy. Armed with seismological records and years of clambering over and around the Mt. St. Helens lava dome to measure swelling, cracking, and escaping gases, they eventually became confident enough to issue warnings about similar events elsewhere. "This was incredibly important," Cashman says, "because no one knew we could make predictions for this type of volcano. The most notable success was Mt. Pinatubo, where hundreds of thousands of people were able to evacuate. It shows that we can live more safely with volcanoes."

Beating the Odds

In geology, the Mt. St. Helens revolution chiefly took the form of improved ability to predict volcanic risks. In ecology, pre-blast theories were flattened along with the forest.

Immediately after the eruption, the land looked lifeless, razed. Dead trees lay in windrows pointing the direction of that all-consuming wind, or stood sentinel in an eerie "ghost forest." Some people compared the blast zone to the site of an atomic bomb blast. Initial predictions were that it would be more than 100 years before the land could possibly recover. But these predictions could not have been more wrong. Today, the dead trees of the ghost forest still bleach in the Sun, but the blast zone is very much alive, supporting a tangle of wildflowers, huckleberries, shrubs, and even baby trees.

There has also been a remarkable explosion in species diversity. Scientists have counted 340 kinds of plants, in habitats that range from gullies and rocky slopes to wetlands and beached logjams created when the blast sloshed lake waters with sufficient force to toss dead trees far up onto the shore. The blast may have destroyed the pre-existing forest, but it simultaneously created a land with a wondrous array of new habitat niches—ones that nature has found and populated with remarkable alacrity.

The early predictions' principle error lay in the precepts of preblast ecology, which viewed the blast zone as virtually sterile—forced to start from scratch in the slow process of ecological succession, in which pioneering plants gradually prepare the way for successive waves of less hardy species. The truth was far more complex. Scientists now know that the mountain's remarkable recovery has been driven by two previously overlooked forces: random chance and leftovers from the preblast landscape that University of Washington forest ecologist Jerry Franklin calls "lega-

[7] "Messages from a Mountain," Jerry F. Franklin and James A. MacMahon, *Science*, Vol. 288, 19 May 2000, pp. 1183-85.

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cies" of the prior ecosystem[7].

These legacies include both the ghost forest and the uprooted trees of the blow-down region. The wood, for example, provided a banquet for wood-boring insects, which in turn drew woodpeckers. Elsewhere, the roots of toppling trees dragged soil, seeds, and forest-floor plants high above the blanket of smothering ash, where many flourished.

It was chance that dictated the nature of these legacies. Not only were individual plants and animals spared by simply being in the right place at the right time, but the date and time of the eruption were also vital to the course of the mountain's recovery. For example, regeneration would have been much slower if the blast had occurred in midsummer, says Charlie Crisafulli, a research ecologist with the U.S. Forest Service's Pacific Northwest Research Station in Olympia, Wash. In May, many lakes were shielded by foot-thick caps of ice, beneath which the blast had little impact. Similarly, lingering snow patches protected underlying vegetation, deep in the blast zone, creating scattered ecological oases called "refugia." Just as important, the blast occurred during the day, when nocturnal animals were safely in their burrows, giving those that weren't too heavily buried an opportunity to dig back to the surface.

Even in an area called the "pumice plain," where the old ecosystem was so deeply covered there was little legacy to jump-start its recovery, chance played a much greater role than anticipated.

Prior theory, says Jonathan Titus, an ecologist at Biosphere 2 in Oracle, Ariz., said that each species of pioneering plant needs a distinct combination of such factors as moisture, slope gradient, soil stability, and elevation above sea level. But when his research team painstakingly measured these and other parameters at hundreds of sites, they found only a 25 percent correlation to the particular species that had sprouted. The seeds, he says, arrived on the wind, and lodged in particular locations purely by chance. If they found enough moisture, they sprouted. "Another species could be there just as well," he says.

Adventures with Amphibians

Farther from the mountain, some of the most startling survivors were amphibians. In fact, in an era dominated by a worldwide decline in amphibians, those near Mt. St. Helens have been thriving. It's one of the ecologists' most important findings because it means that whatever is killing off amphibians elsewhere comes from local, not global, causes. If the problem were increased ultraviolet light, planetary warming, or a widely dispersed air pollutant, the amphibians on Mt. St. Helens should not have flourished.

One such species is the western toad, listed in other locations as endangered. Part of the reason for the animal's population boom at Mt. St. Helens, Crisafulli says, is that its predators—ravens, jays, and snakes—haven't yet recovered. But also, the toad's tadpoles feed on algae in lakes, and the demise of tall lakeshore trees has provided more sun for algal growth.

The tailed frog, whose tadpoles live in creeks rather than lakes, presents a similar but far more surprising success story. The tadpoles have an unusual sucker that allows them to adhere to rocks in current that would sweep humans off their feet. Prior to the blast, says Charles Hawkins, a stream ecologist from Utah State University, the species was presumed to need the damp shade of old-growth creeks. It was viewed as something like an aquatic spotted owl—a signature species of the tiny creeks that gather into the tumbling streams that give the Cascade Mountains their name. Such an animal should have been "totally obliterated" by the blast, says Hawkins. But instead, it seems to have benefited.

The frog's survival begins with the

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now familiar refrain of chance and timing. Like other amphibians, the frogs were dormant at the time of the blast, wintering in burrows dug beneath large boulders. After the eruption, many were unable to dig back to the surface. But a fortunate few were slumbering near springs whose running water quickly stripped away the blanket of ash, clearing the way for their return.

Even so, the adult frogs need shade. In the heart of the blast zone, none survived. But outlying areas didn't see a total demolition of the forest. Patches survived, in ravines or on the lee sides of steep slopes. Here, biologists found 15 times more tadpoles than in nearby undisturbed patches of forest. "This completely flew in the face of conventional wisdom," says Hawkins. As the mountain has revegetated, follow-up surveys have found frogs everywhere except the desert landscapes of the pumice plain, at the very heart of the blast zone.

The frog's repopulation, Hawkins says, reveals a biological "irony" in which the ideal conditions for the adult frogs don't match those needed for their tadpoles.

The adults require cool, damp shade to avoid dehydration. But the tadpoles feed on algae—and algal growth is facilitated by sunlight—normally in short supply beneath an old-growth forest canopy. Just as deer thrive best in areas rich with "edges" between woodland and meadow, the perfect frog habitat mixes forest shade with sunny creeks—exactly the conditions created at Mt. St. Helens.

"One of the lessons we've learned is that homogeneous landscapes aren't all that good for animals," Hawkins says. "Sometimes you need patchy landscapes—especially if you're a species that has a complex life cycle, like the tailed frog."

At least as dramatic is the recovery of 12 of the region's 15 species of salamanders. In some of the lakes, Crisafulli says, salamander counts are among the highest he's ever seen. This is surprising enough in lakes that had salamanders prior to the blast. But the eruption created more than 120 new lakes and ponds, and somehow the water-loving creatures crossed miles of seeming desert to colonize them. In a recent survey of 100 of these ponds, 98 contained salamanders and 92 had breeding populations.

The salamander survival story begins with the sheltering ice that covered their ponds at the time of the blast. But from there, Crisafulli says, the tale centers on a bizarre aspect of their multistage lifecycles. Classically, salamanders hatch and grow in ponds, then metamorphose into land-roaming adults, which return to the water to breed and lay eggs. But some reach full sexual maturity without growing lungs. These "neotenic" salamanders spend their entire lives in the ponds—ensuring that even in the Sun-scorched blast zone, there will always be a next generation. Some of that next generation will themselves be neotenic; others will metamorphose into terrestrial forms that will strike out overland in search of new homes. At Mt. St. Helens, most of these migrants die. But a few get lucky. Perhaps they encounter a fortunate series of rainstorms; perhaps they find seep springs at critical locations.

The salamanders are also aided by pocket gophers, hailed by Crisafulli as "the unsung heroes" of the mountain's recovery. The gophers live underground, in meadows and clear-cuts, eating roots and tubers. When the eruption converted the entire blast zone into one big meadow, it became gopher heaven, particularly as plants began to regrow. The gophers' excavations, in turn, brought seeds to the surface and mixed the rich underlying soils into nutrient-poor ash and pumice. In the process, they created miles of underground tunnels. The salamanders, Crisafulli discovered, found these gopher subways and used them to disperse far more broadly

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than they could have aboveground. It was an important lesson in the value of unexpected ecological linkages.

Not all such linkages are beneficial. The salamanders are also affected by an exotic species, the brook trout, introduced into many western lakes for the benefit of sport fishermen. Unfortunately, brook trout eat salamanders. The trout, Crisafulli concluded, actually have a greater impact on salamander populations than did the blast itself. Lakes with trout, he says, have salamander populations an order of magnitude lower than those without the fish.

Hawkins calls brook trout a "biological pollutant" that now affects 80 percent of once-fishless mountain lakes. "If a volcanic eruption can't get rid of them," he says, "it's very unlikely any of our activities can.[8]"

Erosion's Benefits

Normally, erosion is bad. It chokes streambeds with sediment, kills fish, squanders soil, and interferes with the revegetation of disturbed slopes. In the months following the blast, Mt. St. Helens looked like a perfect opportunity for erosion gone amok. And indeed, creeks initially ran the color of chocolate milk, with egg-sized rocks rolling along their streambeds.

But another of the surprises of Mt. St. Helens was the discovery that rather than simply adding another chapter to the land's devastation, erosion played a major role in speeding its recovery. Not only did it free animals such as the tailed frogs from ash-covered burrows, but it also did much to facilitate the recovery of plants.

Some of the most interesting research in this field was conducted by Fred Swanson of the U.S. Forest Service's Pacific Northwest Research Station in Corvallis, Oregon, who tracked erosive processes on hillsides near the periphery of the blast zone, where ashfall totals varied between six inches and two feet.

Swanson noticed that the ash deposits had two distinct layers: sandy, popcorn-like pumice deposited early in the eruption, and a layer of fine silt that came later on. Rainfall couldn't penetrate the firm upper shell of silt, running off hillsides almost as though they'd been paved in concrete. But the silt wasn't quite as water resistant as pavement, and a spiderweb of tiny gullies—an inch wide and half an inch deep—began to form with the first rains. As the next fall's rainy season progressed, the gullies deepened and widened, but few matured into full-blown arroyos.

There were two reasons why this erosion halted before it became destructive. First, once the outer silt layer was penetrated, the underlying popcorn pumice was highly porous. Rain soaked into the ground rather than running off, shutting down the engine that had powered the initial gullying.

Secondly, before gullies could become full-blown arroyos, they hit the level of the buried soil, with its erosion-retarding layer of rocks, sticks, and roots. This happened quickly enough that many of the trapped plants were still viable,[9] and their regrowth further impeded the cutting of deep, damaging channels. The result: the gullies became streamers of vegetation from which plants spread into intervening areas.

But here, too, random factors came into play. Had the hardpan silt layer been thicker or continually replenished by subsequent eruptions, the erosion

[8] Overall, one of the strongest biological signatures of humanity's tenure on the earth has been our ability to carry species across mountains, oceans, and deserts that had kept them separate for millions of years. This willy-nilly mixing of species may be one of the most irreversible impacts intelligent life can have on a planet, and the role of brook trout on Mt. St. Helens is merely one of the better examples of how difficult such changes are to reverse.

[9] One study found that some species of trapped plants could still grow when freed from the ash as long as several years after the blast.

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story might have been different, as rain and snowmelt ran off the mountain in sheets, sending so much water down the gullies that the freed gully-bottom vegetation was washed away, rather than nourished.

Erosion also played a beneficial role in the forest outside the blast zone, where large areas were still heavily doused in ash. The trees were largely unaffected, but the forest-floor plants were buried. And it was erosion, says Joe Antos, of the Department of Biology, University of Victoria, British Columbia, that stripped away the crushing weight of two to eight inches of ash from buried herbs and huckleberries. Today, he says, these erosion channels are still traced by meandering streamers of the healthiest forest-floor vegetation.

Snow also played a role in the outlying ashfall zones. But here, where the plants didn't need an icy blanket for protection from the blast's heat and shock wave, they grew back better in areas that weren't snow covered. The reason is simple: when dry ash hits wet snow, says Antos (whose research had him spending months digging out buried plants): "This stuff turns into the gummiest, gooiest mess. I bet I could show you today, within two to four feet, where the snowpack lay on May 18, 1980. Perhaps 100 years from now we'll still know."

Despite the patchy survival, Antos also notes that the forest floor has been radically altered. The understory is now dominated by baby trees rather than the moss that is normally one of the mainstays of Pacific Northwest forests. "It's going to be a long time before we have forests like we did before," he concludes. "Even though the trees survived, these ashfall events have major ramifications for the forest landscape, including the next generation of trees."

Lessons from Landslides

Not all erosion has been beneficial. In the Toutle, the original valley was buried beneath tens and even hundreds of feet of mudflows. The river cut swiftly through these—so deeply that researchers could fly helicopters upriver with the freshly created bluffs towering above, on both sides. Today, most of the erosion is lateral, as the river shifts and reshifts its channel by undercutting the crumbly bluffs that flank it. Seedling vegetation that does manage to get established is at high risk of being swept away, and the area's overall rate of recovery has been slow.

Also negative has been the denuded blast zone's tendency to produce landslides, great and small. But here too there are lessons to be learned—important ones to scientists seeking to understand the aftermath of other forest-denuding events like hurricanes, forest fires, or clear-cuts.

Standard theory, says Swanson, holds that that there is a multi-year delay between the time a slope is stripped of trees and the time it's at highest risk of landslides. The reason is that logging and fires leave root systems intact, still binding the soil together. As these roots start to decay, the soils become increasingly unstable, until the spreading roots of new growth are well enough established to add significant strength of their own.

But on Mt. St. Helens, landslides started appearing in the first two years after the blast, casting doubts on the theory and raising fears about the future.

That prompted Swanson to conduct a study of tree roots in the blast zone. Scientists already knew that although some trees had been snapped off, with their roots still in the ground, many had been toppled, with their roots ripped skyward. These windthrows proved to be a mixed blessing. On the positive side, they were the trees whose violent demise had helped bring surviving plants to the surface for rapid revegetation. But their roots were no longer in the ground helping prevent landslides. Overall, Swanson calculated that the

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blast had yanked 60 percent to 75 percent of the total root biomass out of the ground. It was no wonder that landslides began almost immediately.

Landslides not only started unusually quickly, but also continued longer than would be expected for a clear-cut or fire. The worst to date came in the spring of 1996, 16 years after the blast, when entire hillsides gave way, sometimes in wide swaths, following that year's drenching El Niño winter. It was a winter that produced major landslides throughout the West, but the disturbed terrain of Mt. St. Helens was particularly vulnerable because, remarkable as its recovery had been, it was nevertheless revegetating much more slowly than a clear-cut.

Prairie Lupines and Elk Droppings

Deep in the blast zone, ecologists found other surprises. Titus reports that the pumice plains have recovered remarkably quickly, with an amazing diversity of mechanisms. Large patches of showy prairie lupines have sprung up, for example, sometimes comprised of thousands of plants, all descended from a few pioneers.[10] Long-recognized as an important pioneering species, lupines are nitrogen fixers that rapidly enrich the soil, while providing moist, shady refuges for the windblown seeds of other species to take root.

Here, too, random factors are at work. Rodents gather seeds for winter, fail to eat them, and leave them in huge caches. Crisafulli once counted 250 lupine seedlings growing from a rodent's lost cache. On another occasion, he watched a vole harvesting lupines from a location 200 feet from the animal's food cache. After watching it make 40 trips over a distance that for a vole is an enormous commute, Crisafulli investigated the cache and found more than 500 seeds, transported far away from their parent plants.

On another occasion, he collected elk droppings, stored them for several months in a refrigerator to simulate winter, then planted them to see what grew. He found 15 plants, mostly grasses, and three fungi. It confirmed an earlier observation that grasses were becoming established in lupine patches that drew browsing elk. It also set him thinking that the identity of the grasses in any given patch would depend, randomly, on where the elk had eaten their previous meals.

But large as they are, Mt. St. Helens lupine patches aren't spreading as fast as biologists would have expected. Nobody knows why, although there are several theories. One is simply that lupines have big seeds. The original seeds in any given patch must have been carried in by passing animals, but except for animal droppings and the food caches observed by Crisafulli, the rate at which a patch can spread on its own is limited by the distance each year's crop of seeds can roll from their parent plants.

Another factor, says Titus, is that the lupines on Mt. St. Helens are heavily grazed by a species of caterpillar. Oddly, the caterpillar prefers to eat lupines on the edges of the patch, while leaving those in the interior pretty much alone. Again, the reason isn't well understood—maybe the lusher growth and increasing biodiversity at the patch's interior harbors a caterpillar-eating predator—but the result is that these insects help confine the lupine patches by pruning away their peripheries. Whatever the reason, however, the restriction of lupine growth is having a profound influence on the role played by these usually hardy flowers.

Yet another surprise is the limited role

[10] Lupines, a family of wildflowers that includes the Texas bluebonnet, got their name from a botanical misunderstanding. Because they grow in poor soil, early botanists thought they consumed nutrients the way a wolf—*lupus* in Latin—devours its prey. Actually, these members of the pea family tolerate bad soils because they can use atmospheric nitrogen instead of soil nitrates.

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played by the refugia, where deep snow and relatively blast-sheltered slopes allowed patches of plants to survive, sometimes remarkably close to the volcano.

Initially, ecologists expected these refugia to be epicenters for plant migration to nearby denuded areas. But instead of spreading, the refugia have been invaded by plants that initially colonized the surrounding pumice plain. The reason, Titus speculates, is that to date, the pumice plain is too disturbed to support the shrubs and other species of the refugia, which are survivors from a much more mature ecosystem. The future, he predicts, may see a spreading of refugia species, once the surrounding plains are ready to support them.

Teleporting Voles

The refugia do, however, provide mature habitat for small animals—if they can find a way to get to them. Possibly the most startling discovery to come from Mt. St. Helens involved the ability of these animals to do just that, even though many of the refugia were surrounded by barren pumice.

Standard ecological wisdom said these animals could only reach these oases via migration corridors, and that they wouldn't cross broad, open spaces. But mice, voles, chipmunks, and ground squirrels seemed undeterred by multimile journeys; even shrews weighing as little as seven grams somehow made the treks. Crisafulli now believes animals can reach isolated habitats so easily that when they are absent, biologists shouldn't blithely assume the reason is that they can't get there. Rather, he said, it probably means the habitat isn't ready for them.

In years of traipsing over the mountain observing wildlife, Crisafulli has spotted some odd, and utterly unexpected, combinations of animals. Nowhere is this more dramatic than for the birds. At first, the bird populations were limited to two types. In the blowdown zone, the only ones that could thrive were those that nested and foraged on the ground, such as white-crowned sparrows and dark-eyed juncos. In the ghost forest, cavity-nesters did well: mountain bluebirds, hairy woodpeckers, and northern flickers. One species that did surprisingly well was the Vaux's swift, an endangered species for which millions of dollars of prior studies had merely reached the conclusion that it liked old growth. Its presence in the blast zone revealed that what the bird really needs are dead snags—a type of habitat that can be deliberately retained in logging zones.

About a decade after the blast, the monument's bird population expanded, Crisafulli says. Practically overnight, "like somebody threw a switch," warblers and flycatchers suddenly moved in, drawn by the growth of willows in stream channels, where they can nest in the foliage and eat the insects that live there. Since then, the birds, the willows, and a Eurasian insect called the willow stem boring beetle have been playing what Crisafulli calls a game of "musical chairs" as the beetles repeatedly savage the willow populations by tunneling into their stems a few inches below ground. The weakened stems collapse, and the birds and beetles migrate to new habitat until the willows regrow. It's a cycle that continues with no apparent end: willows grow, birds move in, beetles follow, willows collapse, birds and beetles move out—like a computer program trapped in a recursive loop.

Even more interesting to birdwatchers is the mix of species on the pumice plains. Here, there is a unique collection of birds normally associated with three very different ecosystems. These include red-winged blackbirds and savanna sparrows drawn from the Puget Sound lowlands; western meadowlarks, horned larks, and rock wrens normally associated with the Great Basin deserts; and gray-crowned rosy finches and American pipits that usually thrive in

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high-elevation meadows. Clearly, the birds are taking advantage of a transient opportunity, an ecological niche that in a few decades will be well on its way back to forest. It's an interesting lesson, Crisafulli says, in the mobility of birds and their ability to make use of temporary ecological niches.

Ecosystem Moral: "Disturbances" May Be Good

When ecologists get around to cataloguing the lessons they've learned from Mt. St. Helens, the tally may be substantial. Already collegiate ecology texts are soundly post-Mt. St. Helens.

One obvious lesson is the role of chance. Had the Mt. St. Helens story appeared in a work of fiction, it would have been criticized for having too many random plot twists. It sounds like a survival yarn by an author who could concoct no plot mechanism other than coincidence: a blast occurring at a perfect time of day, at a perfect time of year, with all those lucky animals sheltered under ice or in burrows conveniently close to springs that could wash away smothering blankets of ash.

But this, Crisafulli concludes, is the way nature actually works. Ecological succession, he suggests, isn't driven by "average" events occurring throughout a region. "It's the unusual events that make the difference," he argues. "The fact that most of the voles are in the blowdown zone isn't as interesting as the few that make it to the pumice plain and cache seeds."

Even outside the blast zone, random factors played a huge role in setting the forest on its new trajectory. Areas that received more than minor doses of ash will be forever different simply because of random details such as the weather on the day of the eruption, the extent of snow cover, and the type and thickness of the ash. For example, Antos notes, a heavier layer of fine ash might have killed off adult trees by sealing off the flow of oxygen to their roots. Ash with a higher mix of pumice would have made it easier for forest-floor plant shoots to push their way through to daylight. Ash falling on a rainy day would have killed forest-floor plants in snow-free areas as effectively as they were killed by ash that fell atop snow.

These factors also affected animals. Although 12 species of salamanders miraculously survived, three are still absent not only in the blast zone, but from any area that received more than three inches of ash. Since ashfall events have been common in the violent history of the Pacific Northwest, impacts like this make it clear that volcanism has been a major factor in shaping other aspects of the region's biota.

Another obvious lesson is that so-called "climax forests" aren't as static as was once believed. Even without human interference, they are periodically affected by outside events, be they volcanic eruptions, forest fires, or massive windstorms. Each of these sets the ecosystem on a new, difficult-to-predict course that will produce a new "climax" forest subtly different from the one that came before.

Titus sees a crucial lesson for the next attempt to create a livable Biosphere. The original project, he says, presumed that a stable ecology was a static one that could maintain the same steady-state balance forever. Mt. St. Helens has taught that this theory was deeply flawed: disturbance is an inherent and important part of ecosystem function.

Maybe if the Biosphere ecosystem had been designed to be more dynamic, Titus suggests, there would have been more chance for various species to rise to the challenge of controlling the problems that arose. Terraformers and space explorers on generation ships will face the same need to build redundant control mechanisms into their artificial ecosystems. Perhaps the lesson of the Biosphere project, viewed though the filter of Mt. St. Helens, is that just as muscles atrophy if unused,

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ecosystem resiliency also atrophies unless it's given an occasional workout. Otherwise, the ecosystem is unable to cope with minor challenges and spins horribly out of control.

Untangling the lessons of Mt. St. Helens also has practical applications. Not only is it useful, in general, to understand the ecology of volcanic mountain ranges, but these lessons may provide guidance for promoting recovery in the aftermath of human activities such as mining or logging.

The remarkable resiliency of the Mt. St. Helens ecosystem, however, shouldn't be taken as license to cut every tree in sight. "It only works if you haven't compromised the integrity of the area," Crisafulli says. "Here the system had a full complement of species. If the area had been nothing more than a plantation, it would have been entirely different."

There's a lot more to be learned from Mt. St. Helens, and ecologists hope that funding agencies won't forget the mountain during its next 20 years. The existence of research plots established immediately after the blast allows increasingly long-term studies of such little-understood subjects as soil development, says Peter Frenzen, monument scientist for Mt. St. Helens National Volcanic Monument. "Twenty years is really just the beginning," he adds. "In some ways things are just beginning to get interesting." ■

IN TIMES TO COME

One of the most difficult aspects of problems like global warming is that they sneak up on you so slowly that it's hard to work up a sense of urgency about solving them, or even to be sure they're really happening. Or is it? With a system as big and complicated as a planet, it's quite possible that what you thought was a long, slippery slope will turn out to include a cliff edge—a point at which, like a rock pushed to such an edge, things change much more abruptly than you anticipated. That's the situation in Ben Bova's novel *The Precipice*, which we begin serializing in our May issue: an unexpectedly sudden upsurge in greenhouse warming has plunged Earth into several kinds of chaos. Which leaves it to off-Earth colonists to try to secure some sort of future, and those who seize the challenge—people like privateer Dan Randolph—aren't quite the ones you might imagine. But in the long run, which matters more: motives or results?

We'll also have stories by Larry Niven (another tale from "Draco's Tavern"), George Zebrowski, Ron Goulart, and Edward M. Lerner (another episode in the intriguing and well-received future he launched with "Dangling Conversations"). Geoffrey A. Landis takes us back to Mars, via California, in a fact article on some new findings that may shed light on the likelihood of life, past or present, on the red planet. What does California have to do with it? For now, let's just say that it's a good exercise in how scientific insights can come from connecting observations that at first seem to have nothing to do with each other. And you already know how good Dr. Landis, justly renowned as both NASA scientist and science fiction writer, can be at conveying the flavor of scientific research!

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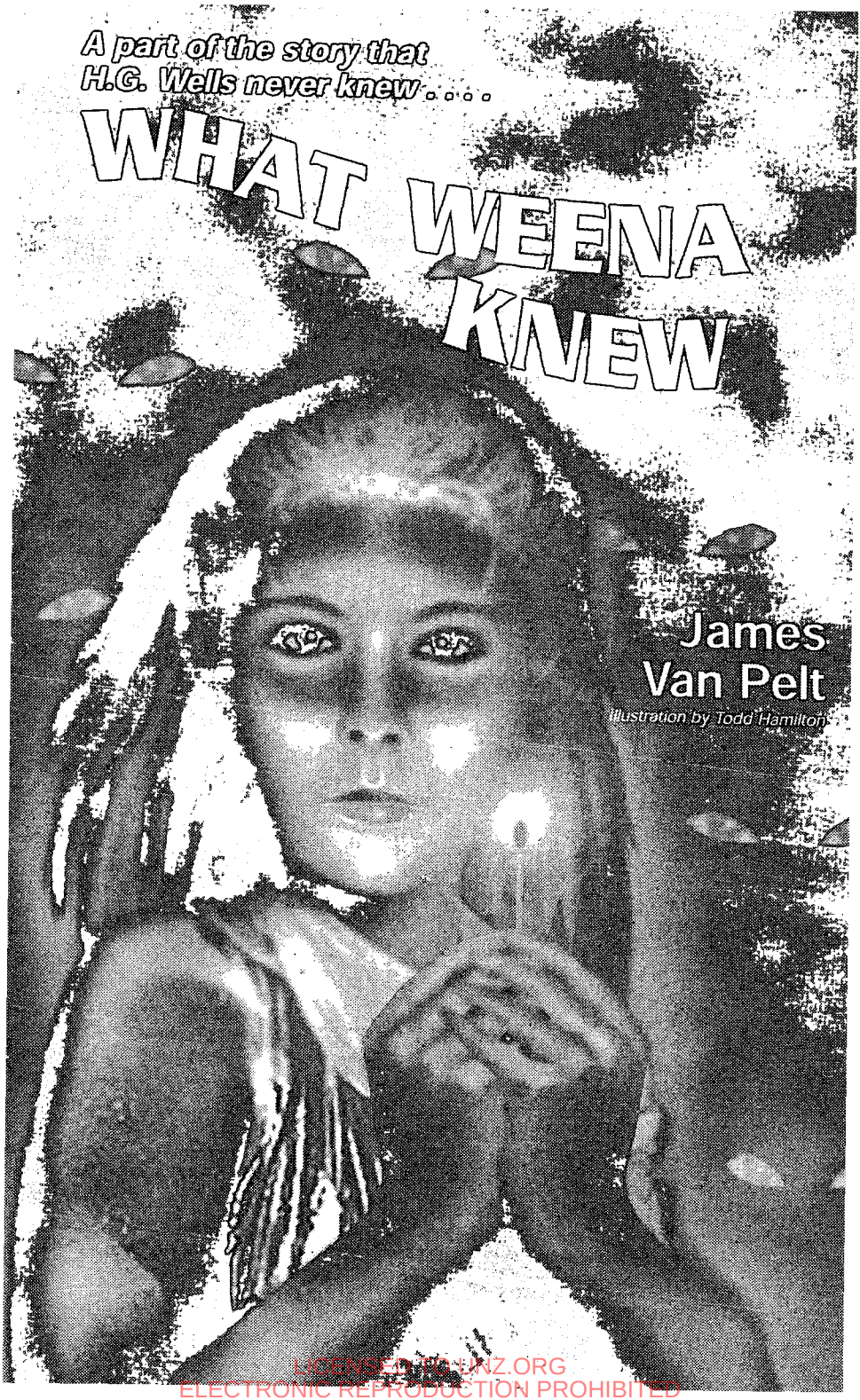
A part of the story that H.G. Wells never knew . . . .

WHAT WEENA KNEW



James Van Pelt

Illustration by Todd Hamilton

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Weena waded away from the others into deeper parts. Current pulled at her tunic, threatened to take her feet from the bottom, but she wasn't ready yet. Maybe one of the others would see her and ask why she was alone, what she was doing so close to the dangerous waters. No one did, even though she stood still for some time, letting her fingers rest in the stream, the cool flow pushing them aside like little fish fins. She squinted against the Sun's glitter; each ripple caught a diamond point and tossed it against her vision, so the stream's middle didn't look like water at all but more like a glittery ribbon, gently squirming before her.

She licked her lips—they were dry—and even though the day was not yet hot, her forehead felt flushed.

No one will come. They don't care, she thought. They're more concerned with gathering flowers, eating fruit and making love until the Sun sets. She closed her eyes. Would it be frightening to fall into the glittery ribbon, or glorious? Would she rise up at the end, a thousand diamond points herself, a sparkling display that none could bear to look at lest they go blind? A step deeper. Water reached midway up her chest; it tugged her hands. Come with me, it said. Come deep and stay.

So she did, and the current took her. For an instant, it was peaceful, the floating as her feet rose from the gravel, and she knew she'd chosen well. No more nights hiding away. No more mornings convinced the Fear was a dream, that missing friends weren't missing at all, just hiding. She marveled at how light she felt. The river held her like a cloud; a child could not ask for a cradle so soft.

Then she inhaled. It burned! Her eyes popped open. Her arms waved and feet kicked. Another rush of gagging water down the throat. It wasn't supposed to hurt! Her face broke the surface. She screeched, glimpsed her friends, then tumbled back under again. Roaring in the ears: current pushing through rocks, waves slapping on waves in the turbid middle. Her hand flailed in the air, tantalizingly above the water, but no movements of her arms or legs seemed to move her up. Her tunic's weight dragged. Then an upswelling pushed her face free for another peek and a half-swallow of air mixed with foam. No one on shore had moved! They weren't going to help her!

But she knew they wouldn't; it wasn't their nature.

A calmness crept through her. She hurt still, but an inner part relaxed. This was the last. The river gripped her and drew her to him, and she understood she would not be coming back up. Light faded.

Then a vise clamped her upper arm. A surge. A tremendous force, and she was clear of the stream. Air! There was air to breathe, but all she could do was cough. She was being carried. Her cheek rested on skin. Huge arms wrapped her close until they were on the bank. Gently, her rescuer put her down. Rock warmed her back; her hands lay flat in the heat; her head dropped onto the warmth. Against the sky stood a figure strangely shaped. Weena's vision swirled—she could barely focus—but before she passed out, she saw in wonder, he was a giant.

Weena's life seemed no different from that of the other Eloi. She was raised by the mothers, played with the other children, learned in time not to eat poisonous berries, grew to adult height, lay with the boys when she wanted, loved the Sun and feared the night. If there was a variation, it was in her absent-mindedness, her willingness to explore beyond the grey home's grounds, to mourn the loss of friends. She cried, which puzzled the others greatly. In the mornings when some Eloi were missing, and the others went off to bathe or play in the grass, she sat by herself. There weren't even words for what she was

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feeling, but the friends were gone. In the dark the Morlocks came and took them. They would never return. There were no words to explain the space in her chest. It ached in emptiness. Then, later, there was another emotion she had no name for. She envisioned herself rising above the Morlocks, fear banished, the sun in her hands, striding toward them, and they fled.

After he made sure Weena was not going to die, the giant donned strange clothes fastened together with round pieces of bones. Weena watched him dress, all fear of the night for the moment banished. He was *huge*, almost her own height again taller than she was, and broad and strong. The face was rounded and lined with wrinkles near the eyes and corners of his mouth. Oddly enough, his hair was straight. His speech baffled her. When she couldn't answer him, he shook his head, gave up and wandered away. Weena followed, staying out of sight. Soon she saw that he appeared to be exploring with purpose. He walked in widening circles, stopping only when he came to the river, then reversing himself. Buildings interested him, even the empty ones no one had lived in for as long as Weena could remember. Even the dark buildings no one entered.

He moved with such purpose! She'd never seen anyone go from place to place as if one were more important than the other.

Who was this alien creature? What did he want here? How was it he could go into the dark without fear?

Weena resolved to find out more. She searched the bushes for flowers to string together until she'd made a necklace big enough. Her nimble fingers wove them together. If the giant saved her from the river, he would not hurt her now, and if he didn't fear the darkness, maybe she would be safe with him. When she finished, she approached, and he let her put the flowers around his neck. They spent the afternoon sitting in a stone arbor, where Weena soon learned some of his speech, but not enough to ask questions. He taught her his words for rock and grass and tree and everything he could point at around him, and then taught her hand and foot and face.

When, in the afternoon, the giant went wandering again, Weena tried to stay with him, but his pace was too fast, and he was going too far from the grey home. The Sun moved toward the horizon, and even though Weena cried out after him, he did not return. She fled to the grey home just as the Sun touched the horizon. A chill shook her as dusk poured over the land. The giant was alone outside, and night was coming.

No one asked her who he was or what he wanted. The Eloi chatted idly among themselves, and even though Weena had spent the most extraordinary afternoon, not one questioned her. She tried to tell some of them, "The giant went into the dark buildings! The giant has stayed outdoors after the Sun set!" but none seemed interested. *She* would have been fascinated. If someone told her such a story, *she* would hang on every word.

Late in the evening, long after the Eloi had gone to sleep, Weena sat up watching the shadow on the wall that was the door into the grey home. Would he return, or would something else come through the door tonight? The moon was over three quarters gone. In a few nights, there would be no moon. It would do no good to run. All she could do would be to lie still and hope they passed over her. It was all any of them could do.

Then, a figure came through the door. Weena gasped; he was so sudden. She'd almost forgotten already how large he was. He found a place and lay down. She rose, walked carefully among the sleeping Eloi, and joined him. At first, he seemed surprised, but he let her rest her head on his arm, and soon he was

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asleep. Weena stayed still, her eyes open. Even his breathing was big; he rumbled behind her. She could feel the heat broadcasting from his chest. His hand, only a foot from her face, lay palm up, each finger a massive curve of strength. She put her hand on his; hers was tiny.

When Weena was young, before she learned about the night, she built a dam on a stream. The rivulet wound its way down a shallow gully behind the grey home until it joined the larger waters. She didn't want to walk all the way to the river to bathe. It seemed so silly. By the time she returned, she'd be just as hot as she'd been before, so she gathered round stones and put them in the water. Methodically she built a wall, and as the wall grew across the stream, the water rose. After the Sun was nearly done for the day, a good-sized pool had grown behind her wall.

In the morning she took some friends to see it. "Look," one said, "Weena has found a pool for us to play in."

"I did not find it," she said. "I built it."

"Why would you do that?"

Weena didn't have an answer. How could she explain the feeling she had while watching the water rise? Bit by bit it swallowed the bank upstream. Gradually it deepened. Her heart filled too. There was a joy in seeing the rushing water stilled. If the wall was bigger, everyone from the grey home could bathe here. They could bathe wherever they found a stream!

But she couldn't say that. Her friends splashed in her pool for the day, and the next day they walked to the river the way they always had. Weena knocked a hole in the wall.

In the morning, the giant ate with the Eloi, trying to talk, but they became bored shortly and no one remained but Weena. She told him the word for each fruit, for the drink, for the table and cushions, for door and window. He told her his words. Soon they left together, and she followed him as he continued exploring buildings, fearlessly plunging into darkened structures, some that Weena knew contained Morlock passages, but despite her pleas he didn't seem concerned.

Where did he come from? What secret did he possess that made him so fearless? The longer she followed, the more amazed she became. In the afternoon, he took them to the winged statue. He walked around it. Weena sat on a smooth stone bench and watched. He pushed on the bronze base, and from his expression, she knew he was frustrated. Clearly he wanted in. Why would he want that? This too was a Morlock place. If he could open it, he would only face a passage into the dark from where no Eloi returned.

Weena hopped off her bench. The giant had placed his ear against the base, then rapped his knuckles against the metal. He moved a foot farther and did this again. Weena touched his back. "What are you looking for? You will wake the Morlocks."

They didn't have enough language to understand each other yet, but he showed her tracks in the lawn. Something heavy had rested in the grass twenty feet from the pedestal. The giant pantomimed dragging an object and pointed to the marks on the ground. She understood. Something of his had been pulled into the Morlock passage, and they'd shut the door to it. After a long series of gestures and using the few words they both knew, she began to understand that the Morlocks had stolen a "vehicle," something the giant traveled in. Weena tried to imagine what the vehicle would look like. Where would he go in it, and why weren't there marks in the grass that showed how the vehicle got there? The lawn was soft from rains and hail-storms over the last few days—even their feet left prints—except there was no sign that showed how the vehicle arrived. Did it fly? Weena asked him if he

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came out of the sky. It took a few tries before he understood what she was asking. He laughed, a booming sound that startled her at first, and he shook his head.

Weena patted his hand, having no words to say to him. If she could just learn what he knew, maybe she could face the night. For the first time since she'd given herself to the river, she shook off its chill. Her throat didn't feel constricted by the water's rush. She could breathe.

That evening, despite her protests, he slept away from the grey home, in the open. Didn't he know about the new moon? But he was determined to sleep on the grass near the winged statue. Weena struggled within herself. He lay down without fear. Shut his eyes. He didn't care if she came or went. He was a giant, safe within himself. She looked at the complex shadows in the bushes, the darkening horizon, and lay down beside him.

Weena learned about boys while gathering flowers one morning in the spring. She'd followed a group of children, and as they spread out down the hill, they separated until she was alone with a boy she didn't know very well. He slept in a different home and had other friends, but he was nice. He smiled at her as they walked together around a pile of vine-choked rubble. Weena smiled back, then moved into low bushes to pick handfuls of yellow blossomed Cheek-daisy.

Something soft hit her ear. She looked up. The boy tossed a flower at her and smiled again. She threw one back, and soon they were wrestling in the soft grass.

Weena knew what was happening. The more experienced girls talked about it, and the adults made love in the open, but she had never done it herself. Some girls said that it hurt the first time. She was frightened, just a little, as she pulled her tunic up around her waist, but it hardly hurt at all, and it was over before she had time to think much about it. Still, it seemed special, and they stayed together for the rest of the day, holding hands and kissing.

The boy's name was Tomey, and when the evening fell, Weena asked him to sleep in the grey home. As the darkness deepened, they snuggled into sleep among the other Eloi, his knees fitting neatly into the backs of her legs and his arms wrapped warmly around her chest.

Then, later, when all was nearly black, something woke her. She didn't move. None of the Eloi did. They never did. The Fear was upon her, cutting her from her muscles, paralyzing her. In the pitchy dark, ghostly figures moved among them. Slyly they slid through the room, hunched over, pale shadows among the deeps. One approached her. Its dry foot scraped the floor. This close, its breath rasped. Its hand touched her shoulder, and she came loose inside. Couldn't move. Couldn't inhale. It reached behind her, pushed its hand along her back and pried Tomey off. His arm pulled out from beneath her; his other dragged across her chest.

Then the Morlock was off, carrying Tomey like a dead thing across his shoulder. Tomey never made a sound.

In the morning, no one talked about their missing friends. Weena looked around her. They rose, ate their fruit, spoke among themselves, made ready to bathe or to play outside. She couldn't speak to them. Instead a pressure built inside her, it filled her lungs, eddied into her throat and pushed at the back of her eyes. Then she wept. Some looked at her as they left, but no one asked her to explain. When they were all gone, the huge room echoed with her sobs.

Over the next couple of days, Weena learned the giant's language as he learned hers. As he continued his explorations, she watched him carefully. He *knew* things; he had an attitude about

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things. At a brown structure, nearly covered with trees and prickly bushes, a stuck door stymied him. Weena waited to see what he would do. His approach fascinated her. He didn't come to an obstruction and give up as the Eloi did—he worried the problem until he solved it. How would he act here? The door to the brown structure had always been closed. The building was impenetrable; everyone knew that, but the giant dug at the door's base, pulling rock and dirt out by the handful. He jammed his fingers into a crack and tugged again. The door moved! Not enough to let him in, but it had never occurred to her to change the door's condition. The giant found a stout branch, worked it into the wider gap and pulled back on it. Slowly the door gave way. He dropped the branch, then squeezed into the building. Weena looked at the branch for a long time. It was like looking at the stream behind the grey home when she was young. There was a problem: she didn't want to walk to the river to bathe. There was a solution: dam up the current until a pool formed.

Weena crouched by the branch, ran her fingers along the rough bark, fingered the place where the door had stripped it to the green wood. She rubbed the sap between her fingers. It smelled fresh. The Morlocks—now there was a problem, she thought. Was there a solution?

The giant emerged, his face smudged.

"It's empty," he said. "What happened to your people? They built these wonderful structures." He waved his hand. From where they stood, she saw a half-dozen other buildings. Some were homes where Eloi slept at night. Some were like the brown building beside them now—abandoned, useless, *dark* places where Eloi never went.

"We do not build," she said. "They have always been here since the day the world was born."

He shook his head. "No, dear Weena. They were built by people. Your people, I suspect, thousands of years ago. By the descendants of my people." He looked sad and said more to himself than to her, "What happened to us?"

By the afternoon, Weena was too tired to follow the giant any further. She returned to the grey home to eat. Thoughtful, she munched a fruit in the warm light that poured through the windows high on the grey home's walls. A boy she recognized but had never talked to sat beside her. "You speak with the giant. What does he say?"

She looked him over. He was younger than her by a year or two. Bright eyes. Curious eyes—something she didn't see in the Eloi, ever. In the days she'd spent with the giant, no one had asked her about him. "He asks a lot of questions," she said.

"About what?"

"Why do you want to know?"

Around them, other Eloi ate or played or talked their idle chatter.

He squirmed in his seat, didn't meet her eyes. "I'm sorry if I'm bothering you. It's just . . . well . . . sometimes I . . . wonder about things."

The silence stretched between them. She could tell he was on the verge of bolting.

"So do I," she said.

He looked up gratefully. "Really? I thought I was the only one."

"What is your name?" she said.

"Blythe."

"I am happy to meet you, Blythe."

She spent the afternoon answering his questions until evening came, then she went outside to find the giant, who continued to sleep away from the grey home, fearless of the approach of the new moon and the Morlocks.

On his fifth morning with Weena, the giant marched to one of the Morlock portals, a low, circular wall around a bottomless shaft, protected by a sturdy, stone cupola. There were dozens of them in the area.

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"I'll come back, Weena," he said, and kissed her on the forehead.

At first Weena didn't understand what he intended, but when he threw one leg over the wall, she grabbed his shirt sleeve and pulled him back. "You cannot go down. The Morlocks live there."

He shrugged her off and vanished into the shaft. Weena peered down after him, her limbs shaking. He was already many feet deep. He smiled at her, then continued the descent. Weena watched after him until she could see him no more. A dull thudding vibration came from below, and she could feel air being drawn into the shaft.

Until this time she thought her interest in the giant was to find out what he knew, to learn from him, but as she peered into the blackness, she realized she worried about him. She didn't want him to be hurt.

She sat on the grass near the cupola, determined to wait. Soon, Blythe came and sat beside her. It seemed obvious that he'd been watching them from some hidden place.

"Will he come back?" he said.

"How can he?" Weena plucked a blade of grass, wrapped it tight around her finger until the grass broke.

"He is a giant," Blythe said with confidence.

Weena thought about this with wonder. "Yes, he is," but she didn't believe that he would return.

"He will teach us how to protect ourselves from the Morlocks."

Astonished, Weena looked at him. Although she'd thought such things, she'd never heard anyone say them.

But Weena didn't believe the giant would return until some time later when his hand appeared at the wall's edge, and he crawled out to collapse on the grass.

Crying with joy, Weena kissed his hands and face until the giant laughed at her and hugged her close. Then he fell back and slept. Weena sat with him, holding his hand until he woke much later.

* * *

That afternoon the giant went exploring again with renewed purpose. He wouldn't tell Weena, but something he'd seen underground clearly bothered him. In each building, he examined the doors, the broken windows. In many he found Morlock passages, and he left in disgust. Unlike his trips before, when Weena tired, he picked her up and let her sit upon his shoulder.

Weena wrapped her arm around his head. He set out away from the grey home in a straight line, and his long strides swallowed ground at a dizzying speed. After a while, she could see they were heading toward a distant building, a huge, green structure in the hills that no Eloi she knew had ever visited. Soon, though, the Sun slipped behind the hills, and the air grew cool.

"We need to go back," she said. Overhead the first stars glimmered through the dusk. She clung tightly, but he didn't answer. He appeared tireless. Weena wondered if they would walk all night. Could the Morlocks even catch them at this pace? Would they dare attack him? He'd gone straight into their lair and emerged unscathed. Maybe he couldn't be hurt. Maybe they feared him as much as she feared them.

She thought about this as the night swept over the land. Maybe he had no secrets to discover. If all that protected him was his size, then she might as well return to the river and let herself drown. She remembered the moment of peace, the comforting water's roar as she floated downstream. Then she remembered the first gagging swallow. She shuddered. Was drowning better than the Fear when nothing could move her, when her arms and legs betrayed her, when the Morlocks walked among them?

Still, the giant pushed forward. Weena rested her cheek against his head, closed her eyes against the thousand stars and fell asleep.

* * *

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In the morning they set off again.

After they had covered some distance, he said, "I come from far away."

Weena walked beside him. He had thrown away his shoes and seemed to have picked up a limp. She chose her words carefully. He didn't talk about himself much. Most of their conversations were about her or the Eloi. "I know. You came in your vehicle the Morlocks stole."

He stopped, sat down and rubbed the heel of one foot. A purple bruise marked it. He massaged it gingerly. "My vehicle doesn't travel *distance*," he said. "It travels in time."

Weena didn't know what to say, so she smiled and nodded.

"My house used to be by the winged statue, where we saw the marks from my vehicle. I didn't move an inch, but I traveled many . . ." He searched for a word. "Lifetimes. Many, many lives passed while I rode. So many that the world was different. None of these buildings were here. There used to be a city, London, and I lived there with others like me. We ruled great machines in my city that would do our work for us. Make tools for us. Take us from place to place without walking. We could send messages across tremendous distances to learn what was going on in other parts of the world."

He kept talking about where he came from while Weena puzzled over the idea of travel through time. How could one live many lifetimes? And there was only one question that mattered, though. "Were there Morlocks?"

He shook his head. "We had our own demons." The green building stood on a hill beyond a tree-filled valley. They would be there after a short walk. The giant looked across the valley, past the building, as if he didn't see it standing there. "We fought them. We didn't wait for them to consume us." He wiped his mouth. "Mankind was never meant to be cattle."

"I don't understand . . . cattle?"

"Of course not," he said, shifting his gaze to her. He looked tired. She wondered if he'd slept the night before. "You live on milk and honey. *You're* the fatted calf. What does the herd think about when they're in the holding pens, when they're led up the long ramp to the slaughterhouse?"

His face flushed. Weena touched his hand. She didn't know all the words he used, but she got the sense of them. "You fought your Morlocks?"

"In a manner of speaking, yes." He squeezed her hand. "I don't know why I should tell you these things, sweet Weena. You are not equipped to understand them. Evolution has robbed you of reason. You live a beautiful life here. A beautiful, thoughtless life with something ugly underneath. Maybe it's best if I don't paint a different picture." He stood, grimaced when he put weight on his foot. "It's better when you are happy."

She thought, but I'm not happy! I'm frightened all the time. What can you teach me? What do you know? But she didn't know how to ask the question. He took her hand, and they started down the hill toward the green building.

Weena walked beside him struggling with a new thought. They *fought* their demons, he said. If he would only show her how.

The green building was tremendous! Weena had never seen a structure so large. The first room's ceiling was vague in shadow, and long spears of hazy light cut through broken windows high above the floor. The giant paused beside a pile of bones so old that many crumbled when he touched them. "This was a dinosaur. We're in a museum," he said. At one side of the room, he cleared dust from sloping shelves. Weena peered around him. The shelves were glass, and within the boxes were stones and animal teeth and other items she did not recognize. The giant moved excitedly from display to display, knocking a per-

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fect storm of dust into the air.

He said, "Here is sulfur. If I could find saltpeter, we could build a little surprise for the Morlocks." But he didn't explain what he meant. He moved from room to room, casting about from one side to the other. Weena trailed him, hushed and expectant. He would find a tool they could use against the Morlocks. They wouldn't need to fear the night of the new moon any longer!

But as the giant continued to search farther into the green building's depths, he found nothing useful, and the rooms grew progressively dark. Weena stayed closer, trying to see into the rooms' unlit corners, wary of the cavernous shadows beneath the tables and machinery they passed. Several times she saw narrow footprints in the dust. The giant didn't notice until a stealthy pattering of footsteps echoed in a room. He grabbed Weena's hand, looked around until he found a metal bar protruding from a rusted, useless machine. He broke it off, hefted its weight. "Now I have something," he said.

Weena bit back her disappointment. All this way for a club? No tools like he'd spoke of? No machines that would jump at his bidding? Just a club? Having clubs would not save the Eloi, even if she could convince the others to use them. Once the Sun set, the Fear would petrify them, just as it had immobilized her when Tomey was carried away. The Eloi could not defend themselves in the dark.

The giant said, "We will be out of here soon enough, little Weena." Now he moved from room to room with refreshed urgency. Weena stayed close. Dirt blocked the light through most windows, and the afternoon was wearing away. In a nearly undamaged gallery, the giant found something that pleased him: in an unbroken case, a box of matches. He danced with delight, kicking clouds of choking dust off the floor. In another case, he found a sealed jar that when opened exuded a pungent odor. He was nearly as pleased with this new discovery. "Camphor," he said. "It burns."

Weena didn't know the word, "burns," but she recognized the matches. He'd amazed some Eloi with them in his first days, scratching them against a rock and then showing the yellow, dancing light at its end. Why he was happy to find them, she could not decide. More importantly, the Sun through the windows was failing. Tonight was the new moon, and she'd seen too many Morlock signs within this cavernous building. Soon they'd be rising from their subterranean hiding places, and the giant had found nothing helpful other than a club and his glowing toy. Could he protect her? Would he protect her?

At the river, the Eloi had watched her swept downstream. She'd screamed, and none of them moved. Why would the giant help her now? Why had he saved her at the river? She held his hand as they retraced their path through the building until they emerged through the broken doors. The Sun rested partly below the horizon. By the time they reached the forest's edge, it was fully night. Oddly the giant had gathered sticks and branches until his arms were full. Weena's eyes ached with trying to see into the woods. There! Was that a white shape moving? There! Another one. Even the giant noticed them slipping from shrub to shrub. The forest air rustled with their passing. Leaves crackled under unseen feet on all sides.

The giant set the branches in a pile on the ground. He scratched one of his matches into its tiny, yellow light. Weena hadn't seen a match at night before. It was surprisingly bright. Then he pushed it into the branches. Twigs grew yellow with a luminous vapor. Branches glowed, and a moving, sinuous presence rose from the wood. Weena leaned forward, fascinated. What is this? she thought. It's beautiful, like the Sun captured on the ground, like the diamond ribbon in the stream's center. It threw light into her eyes. She reached for it.

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The giant stopped her, but she'd already felt its heat. It *is* the Sun, she thought. He can make day! For a moment, she forgot the pressing dark around them, the rustling steps just out of sight.

"It's a fire," he said. "Didn't you know?" She heard the surprise in his voice, as if what was happening was a common occurrence.

Soon all the branches crackled in flame. Every once in a while a sharp pop sent sparks flying from the damp wood. An ember landed near her foot, pulsing with heat like a tiny heart.

"Come on." He grabbed her hand and pulled her into the wood. She turned to look back. The burning had crept from the pile of branches into the brush beside it. Fire writhed in the leaves, but it grew smaller the farther they walked. "If we get beyond the forest, we'll be safe enough," he said.

Weena looked up. Through the trees there was no trace of moonlight. Only the occasional star peeked through. She could feel the urge building inside, the Fear, that yelled at her to lie down. Avoid notice! it said. Become still and small and you will live. Something soft touched her neck. She twisted away, slapped against the giant's leg, but she couldn't see. Was it a leaf?

Twigs snapped around them. Indistinct voices, animal voices, murmured in the dark. Weena jerked her attention to each new sound. She was touched again. Her throat froze.

Then the giant let go of her hand.

There was nothing else to do. There was no way to resist the Fear anymore than she could stop from blinking if dirt flew in her eyes or she could stop from inhaling when the river swept her away. She dropped to the ground. Lie quiet, the Fear said. Be dead. They will pass you by.

But another voice in her mourned. She had lost. The Morlocks would have her. There was nothing to learn from the giant with his long strides and strange clothes and talk of vehicles that traveled through time. He was just a big man with a club, and what good was a club to the Eloi who reacted to threats in the dark by falling down?

A Morlock hand touched her. A horrible soft hand that crept down her arm, around her waist. She couldn't see; it was black as a cave. Weena felt regret through the Fear. If she could cry now, she would cry for herself. None of the Eloi would.

Then, a flash of light. The Morlock hissed, let go and ran away. Cracking her eyes open a tiny bit, she saw the giant light some of the camphor, and the little flame was enough to drive the Morlock back. He pulled branches out of the trees, piled them on the flickering patch. Soon a smoky fire illuminated the trees around them. Still, Weena could not move. She felt the Morlock's hand on her.

The giant picked her up, spoke to her, but she kept her eyes shut. Fear filled her. Closed her throat. Don't let them know you are alive, the Fear said. Soon the giant put her down. He sat beside the fire, and within moments his chin dropped to his chest. He slept.

For a long time Weena stayed on her side, her arm trapped beneath her, her face pressed into the forest floor's dry leaves, watching the fire. Gradually, the Fear left. The cheerful flame leapt through the branches. Green leaves curled, caught fire and vanished in smoky puffs. She crawled next to the giant. On the ground next to him was his box of matches. He must have dropped them. Weena held them close, put her head against the giant's leg. The fire bathed her in warmth. Pungent smoke blanketed them. Watching the flames was mesmerizing. They danced like river waves, always moving in place.

She woke to an uproar. The giant was shouting and all was black. The fire was out! Weena heard him running, yelling incoherently. A creature rushed by her, and then another. The woods reeked

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with Morlocks, their strange cries rent the air. Her body locked into place. Something stepped on her foot as it ran toward the giant. A metallic crunch silenced one voice. Even gripped by the Fear, Weena smiled. So the giant's club worked for him after all. The Morlocks could be stopped. Her smile slipped away. None of the Eloi would ever know. And what good was the knowledge? They came out at night, when the Fear ruled.

More blows in the dark. Not so loud now. The giant moved away from her, by the sounds of it, fighting Morlocks the whole way. She believed he would survive them. He had gone into their home armed with nothing and emerged. With a club, the giant would be unassailable.

Only now she was alone. Maybe they wouldn't find her, if she stayed absolutely rigid, but Morlocks filled the woods. Their footsteps, their cooing voices were everywhere. When the giant escaped, they would take her.

Weena fought against the Fear. If she could only move. The matches were in her hand. A little movement, hardly any effort at all would light one. She could save herself. The box rested against her fingers. I can grip it, she thought, and she forced her fingers to close around its square shape. A triumph! Had any Eloi ever struggled like this before? Giving in was so much easier. Do nothing. The danger will pass. Her breath came in short gasps now. She pictured the Sun beating down the grassy meadows, the diamonds in the stream. Painfully, she rolled onto her back. Real pain, like forcing her limbs into unnatural position. A moan escaped her. Weena scrinched her face in effort so hard that she saw red in the darkness.

A roaring sound began to overwhelm the Morlocks' shouting. She couldn't hear the giant any more. Like a wind through the trees, it came, and Weena suddenly opened her eyes. The red was real. The forest was on fire. Their first fire must have spread, and a bright wall of light flowed toward her through the trees. It released her, the light, and her muscles relaxed. She sat. A Morlock broke into the tiny clearing, its broad eyes streaming tears; it slammed into a tree, twirled in pain, and ran on straight toward the flame.

Weena stood, brushed twigs and leaves off her tunic. The fire didn't leap from tree to tree quickly. She had no trouble staying in front of its progress. Every once in a while, other blinded Morlocks would stagger past, some toward the fire, some wandering in circles. She stayed away from them.

When morning came, parts of the forest still burned. Weena could not find the giant. Exhausted, finally, she walked toward the home, but it was miles and miles away, and she didn't have him to carry her. By the time the Sun was overhead, she was too tired to go on, so she stretched out on the grass. Wood smoke filled her nose, and she slept.

Blythe met her at the winged statue as evening fell. Footsore and hungry, Weena sat on the bench she'd rested on days ago when the giant had knocked on its metal walls.

"The doors were open earlier, and there was a machine behind them," Blythe said. He sat next to her on the bench. "The giant went in. Then the doors closed. The Morlocks must have got him."

Weena put her hands behind her and stretched her back. She had never walked for a whole day before. Her body was a medley of aches and surprising stiffness.

"I don't think so, not if he got to the machine first," she said. The giant had told her he could travel through time. She imagined him vanishing from the Morlocks' grasp, just as they descended upon him.

"Either way, he's gone," said Blythe.

Continued on page 138

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BIOLOG Jay Kay Klein

James Van Pelt

The best known Van Pelts were Lucy and Linus, created by a cartoonist, until James Van Pelt started appearing in *Analog*. James was about the age of his comic-strip cousins when his father introduced him to science and science fiction. Dad was an aeronautical engineer for Martin-Marietta in Littleton, CO. Night tests of rocket engines would sometimes rattle the house windows. Scattered around were SF magazines and books, along with *Sky and Telescope*. When watching new SF movies at drive-ins or late-night oldies on TV, Dad explained what was real science and what was dramatic license. Dad's homemade reflector brought real space to the backyard. Jim was bred to be a science fiction writer. This took over 30 years.

In a town full of rocket engineers, the local library subscribed to *Analog*. Jim read all the back issues and waited eagerly for each new one. He figured someday his own books on library shelves would nestle between Vance and Van Vogt. He also had a love for the elegance inherent in fine writing. His first wordsmithing was lots of poetry in high school. Later, he loved crafting short stories. From Metropolitan State College in Denver he received a B.A. in English and History, along with a teaching certificate. In 1988 he took a two-year sabbatical from teaching high school English to earn an M.A. in Creative Writing at University of California in Davis. His thesis was a collection of short stories, many featuring SF, fantasy, or horror.

Appearances in little magazines formed a work-up to *Analog* in 1997. A flood of sales followed not only to *Analog* but also to *Asimov's* and the few other fiction magazines still being published. When newsstands dotted every city and magazine racks were ubiquitous in stores, writers with Jim's abilities would have appeared in dozens of magazines and required multiple pseudonyms. These days, the major outlets for his carefully crafted short stories are theme anthologies. In 1999 he was a finalist for the John W. Campbell award for Best New Writer.

Working by day as a high school and college teacher and transformed at night and weekends into a prolific writer, Jim had read through the entire field of science fiction so that he knew what had already been done. It was not so much standing on the shoulders of giants so he could peer further as it was to avoid following in others' footsteps. Essential to the best science fiction is originality. New writers too often reinvent literary wheels or reuse well-explored corners of science. Cutting-edge science fiction demands leading-edge science and characters in new situations. In his undelivered acceptance remarks prepared for receiving the Campbell award, he acknowledged debts to Robert Heinlein, John Campbell, Larry Niven, Ray Bradbury, Lois Bujold, and many other writers. He thanked those who had helped and encouraged such as Stan Schmidt, Gardner Dozois, Robert Silverberg, and Orson Scott

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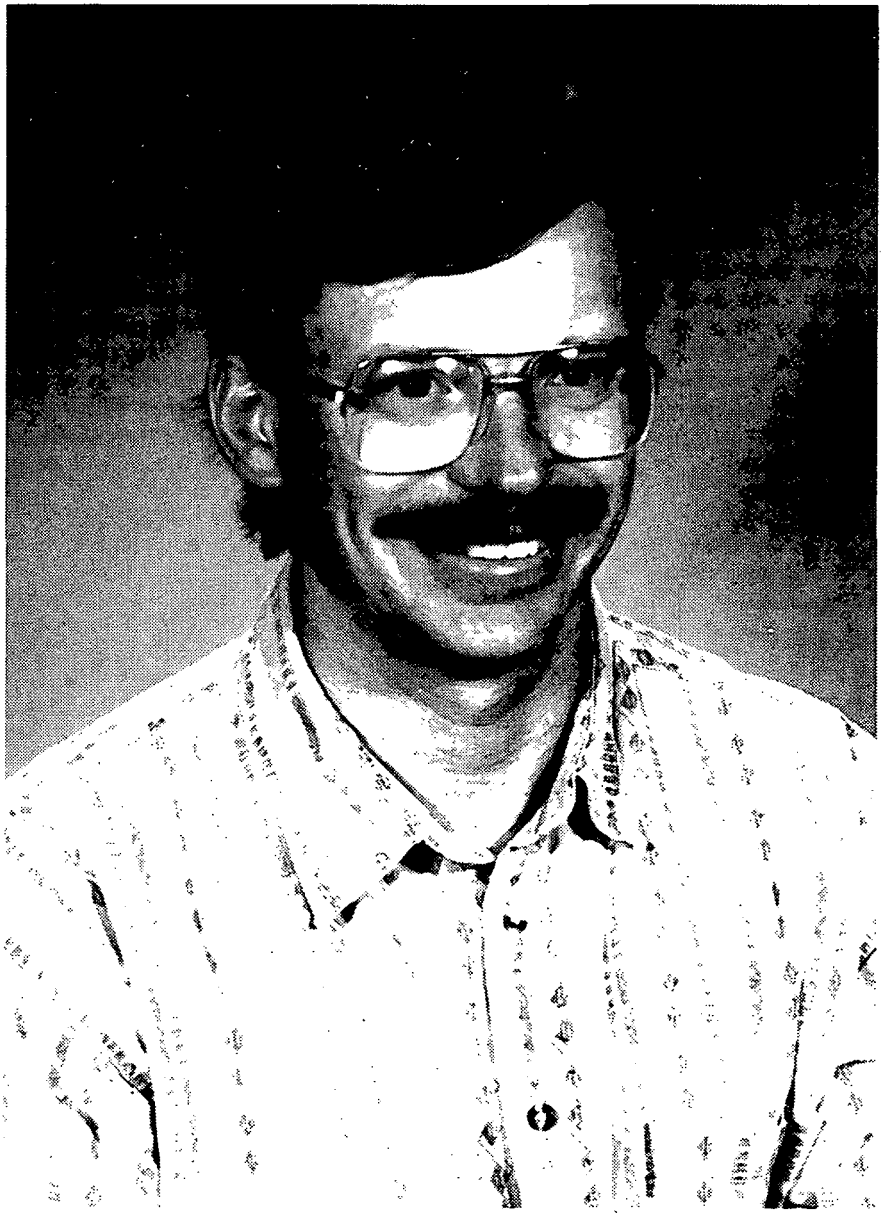

Card. These acknowledgments were a compendium of a lifetime of influences.

It all started at home. He thanked his Mom for not buying candy very often but always finding money for books. He thanked his Dad for showing him Saturn's rings, building rockets, and staying up late to watch Scifi theater. This Van Pelt was created for real by parents. ■

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THE WANDERLUST

Brian C. Coad

If more is better, is still more still better?

I'm no computer expert. The PC on which I do my work is now, like myself, pretty old. When its manufacturers assembled its parts into a useful tool, the politically correct order of the day was Political Correctness. Its manufacturers claimed they had designed it to be particularly helpful to writers, which is why I chose it. It was empowered, they said, to offer constructive criticism, to protect authors from Political Incorrectness, and, best of all, to offer huge menus of helpful choices whenever errors semantic, grammatical, logical or of other kinds occurred.

Their claim concerning menus is well justified. My machine is never at a loss for a helpful menu. Unfortunately, I have never discovered how to discourage it when I need no help. As I work, it duels with me, forcing me to click on **IGNORE** to the point of wearing out that option. In all fairness to it, though, I must mention an upside. My battles with it generate floods of adrenaline, or, as modern neurochemists prefer, epinephrine. For a writer, there is no more creativity-inspiring stimulant.

That's why I put up with the damn machine as is, instead of learning to control it.

Last April, on a wet Californian afternoon, my computer was up to its usual tricks. The story I had going, for reasons of plot, required me to quote the familiar sentence, *All men are created equal.* (The story itself, I note in passing, needs no detailed discussion, since it had no bearing on the events that occurred later that afternoon.)

I typed in: *All men are created equal.*

The machine promptly leapt into support—or adrenaline-stimulating—mode. *Statistics show that ninety eight point seven five two percent of Americans do not believe this,* it told me. *Click* **MORE** *if you would like alternative choices.*

I clicked **IGNORE**.

The machine asked: *What about women? Choose a less controversial phrase from the menu.*

I killed that bunch of choices.

It crossed my mind to shut down the machine and spend the rest of the afternoon tidying up the accumulated junk in my basement, which sorely needed attention. This—day in, day out, year in, year out—crosses my mind frequently, but I never act on it. The machine won't let go of me. As usual, before I could take action, it had another message for me. *Besides, it is not true that all men are created equal. Accidents of birth invariably determine human inequalities. You are cautioned not to be argumentative unless it is truly necessary.*

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Foolishly, I chose to argue. *It's truly necessary,* I told the machine.

It did not believe me. Instead it offered me another long menu with choices galore. **IGNORE**; **IGNORE**; **IGNORE,** I clicked.

The end result was that a piece of work which should have taken a few minutes, consumed a whole hour of my life. My basement remained unattended to, but I felt thoroughly stimulated.

Before I could translate stimulation into further creative endeavors, my doorbell rang.

I clicked **SAVE** and put the machine to **SLEEP**.

I left my living room/study, and headed towards my front door. My head, denied an outlet for its epinephrine-stimulus, turned angry. It cursed the computer, with its surfeit of choices. It cursed its generation-ago designers and their belief that everyone salivated for more and more choices. It cursed the Politically Correct who dictated that it is the height of civilization to have more choices than one can handle. Then it moved beyond the computer to curse the brilliant souls who offer me, in my modest Berkeley home overlooking San Francisco Bay, a choice between ten electricity suppliers and forty telecom companies. It cursed my bank, which, since old-fashioned me rejects on-line banking, offers me over thirty varieties of old-fashioned accounts. It cursed the dozens of gas stations within ten miles of my house, which promote more than fifty variants of fuel for my car. By the time I reached my front door, it had cursed every species of choice it could think of. Choices, it told me, do nothing but waste the time of your life. They only serve to confuse you, poor human.

I opened my front door. Wind gusted in, driving chill rain.

On my doorstep stood a scarecrow figure of a white male, rain-soaked and dripping. The wind tried, and failed, to unravel his tangled hair, which, I thought, must never have encountered comb or barber. His wild beard—I swear this was not my imagination—had green streaks in it; verdigris green, not emerald. Even the pelting rain had failed to wash them out.

His body was clothed, more or less, in a ragged corduroy suit. "Yes?" I inquired, feeling a sense of repulsion as I sniffed the air.

He fixed feverish brown eyes on me. "Wally Mason!" he said.

"I am Wally Mason."

"I know. Thank God I've found you! Please let me in."

My body language, I suppose, told him I had no intention of doing any such thing. "I'm Bannister,"—his tones pleaded—"you remember me? Surely you do, Wally!"

I peered at him, searched those feverish eyes. Recognition came slowly. Then I knew he was, indeed, Bannister—Claude Bannister—a one-time fellow-employee of mine at General Business, Inc., otherwise GBI. Before my retirement some time ago, I, as GBI's Patent Attorney—an office in which I served for close on forty years—had done considerable business with him. After I was put out to pasture, I remained connected to the corporate grapevine. Bannister, I heard, also retired—early—and had become one of the first subscribers to a new GBI product line, a *Personalized Baronial Fiefdom*, or *PBF*, as Marketing put it. According to the advertisements, he should have lived happily ever after.

How on Earth had my former colleague come to this?

Smothering the sense of repulsion I felt, I stood aside and gestured for him to enter my house.

As he came inside, he said: "Love me, Wally! Please love me," then added, as if in explanation, "I have the Wanderlust."

I possessed a vague awareness of the sickness the media christened Wanderlust. Since it was an affliction visited only upon the very rich—people entire-

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ly out of my class—I had paid about the same attention to it as I might to a flood in China or an outbreak of ebola in Africa. Probably I did note that one or two purchasers of GBI's PBFs had contracted the disease, but when the media dragged from their archives stories of ergot poisoning, the Devils of Loudon, medieval flagellants, and dancing sicknesses that occurred in times of plague, I concluded it was one of those overhyped stories with little factual foundation. Indeed, I went so far as to suspect Wanderlust was a mere creature of GBI's creative marketing department, devised to publicize their PBF product line. I had plenty of better things to keep my mind occupied.

But there it was. The Wanderlust, embodied in Bannister, now dripping rainwater onto my living room carpet, had come to visit me.

Bannister first entered my life—oh—a good quarter century ago. He was a young man of great promise then, always immaculately dressed, ambitious, self-assured. He had put together, and presided over, a small genetic engineering company. Following the lead of a software outfit of the day called Boole and Babbage, he registered his outfit as Mendel and Leeuwenhoek. It was commonly known as M & L.

M & L was set up, primarily, to exploit an invention reduced to practice by his principal scientist, a Dr. O'Shea, who had developed means of adding the nitrogen fixation talents of legumes to other plants, notably to wheat and corn. Competent Bannister turned the invention into modest profitability. GBI's Chemical Division, big in nitrogenous fertilizers, took note of this, and brought it to the attention of Noonan, our then president. On Chemical's urging, Noonan sought, as a defense strategy, to acquire M & L. He was also interested, I am sure, in their profits and growth potential.

Bannister, at Noonan's invitation, visited our head office in Connecticut to negotiate. As corporate patent attorney, I was called into some of the sessions, my assigned task being to review and verify the solidarity of M & L's patent position.

My formal acquaintance with Bannister began at those sessions. Informally, as was my habit with clients, I also tried to establish a friendly relationship with him. He proved to be a standoffish character, disinclined to socialize with a mere patent attorney.

That attitude of his, I recall, did not unduly surprise me. Ambitious young men with MBAs (he had one) often avoided personal relationships, real and potential, in order not to be diverted from their pursuit of personal success. Probably, at the time, I would have labeled him arrogant. Now, in objective maturity, I judge that he—along with many like him—suffered from a major sense of his own inferiority, combined with deep feelings of insecurity. Sympathy would probably have been of more help to him than the rather haughty disdain with which I reacted, but it was a long time ago. Now it is all water over the bridge or under the dam.

I reviewed the M & L patents. They were in good order. So was everything else.

For what, to me, was an immense sum of money (much of which went into Bannister's own pocket), GBI acquired M & L.

Some time after the acquisition was complete, Noonan had me visit Bannister to see if he had other exploitable inventions tucked away in his desk drawer.

I flew off to California.

As it happens, Bannister's office and plant were located only a few miles from where I now live. My first visit there was not particularly productive. The M & L president continued to distance himself from me. We invested considerable time in superficial chitchat, but when I tried to pin him down to specifics concerning M & L inventions and plans, he of-

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fered only generalities.

Eventually, but grudgingly, he said I should visit his principal scientist, Dr. O'Shea, or rather, as he pronounced the name, Dr. O'She-a. I remarked on the pronunciation. "She claims her name is a variant of Ayesha," said Bannister. No doubt my face registered surprise on hearing that his principle scientist was a woman. In those days, few of my inventors were female. Bannister misinterpreted my look, and went on about the name. "You remember Ayesha, in a Rider Haggard book? Not much read now, I suppose. *She-Who-Must-Be-Obeyed*. O'She-a reckons she is, in fact, a close relative of that *She*."

She must be some kind of Californian nut case, I thought, if she claims to be related to a fictional character. Still, the truly creative ones were often eccentric. And interesting. I welcomed Bannister's offer to have me visit O'She-a.

Yes, O'She-a is indeed *that* O'She-a who enjoyed her brief fifteen minutes of fame when the media became aware of her world-shaking invention of the plant that bears her name, *"alfalfa O'Shea."* Is she still remembered for it? The media folk, biased as they are against anything that looks like scientific nomenclature, soon substituted the mundane *water plants* for *alfalfa O'Shea,* and her fame drew to a rapid close. It is often so with inventors who transform our whole human condition. The media (and the public) appear to prefer football players and movie stars.

O'She-a, Bannister told me, lived and worked, not in California, but in a remote canyon in the Four Corners area of the southwestern United States. He could not set up an immediate visit for me, but would do so as soon as he could. I had no choice but to return to Connecticut and await his summons.

During the two or three weeks which elapsed before that summons came, I recall rereading one of Tony Hillerman's books. Hillerman wrote eloquently of the O'She-a country. He got me impatient to visit it.

Eventually Bannister called, told me I was to meet O'She-a at the Albuquerque airport, and that she would take me to her canyon laboratory. He did not tell me she would have me ride a horse down to it, but it was so. The horse, I recall, was tranquilized by a virus she had invented.

The O'She-a lab was housed in a modernized version of one of those Anasazi buildings in a cave. Her canyon itself, and its surroundings, were every bit as spectacular as anything in Hillerman. O'She-a's accommodations had every modern convenience, an artesian (as I thought at the time) water supply, electric power from solar cells on her canyon's rim, and even an elevator that ran up to the rim, although on the opposite side from Albuquerque. And the lady herself? She was young, beautiful, intelligent, and the most remarkable woman I'd ever met.

But I have to be firm with myself here. This, I have to remember, is about Bannister and the Wanderlust, not about her. If I begin on O'She-a I might run on endlessly, without ever getting that job done. Besides, she is out of the country now, gone, I understand, to Tibet.

O'She-a's alfalfa invention, however, is of fundamental relevance to the Bannister story. Indeed, it became, as O'She-a herself foresaw, one of the pillars on which GBI constructed its concept of PBFs. Thus Bannister's sponsorship of her work became an important factor in his subsequent life-style. Thus, in a sense, he brought those Wanderlust troubles of his, which he brought to my house, upon himself.

O'She-a's *"alfalfa O'She-a"* invention consisted of means to genetically modify alfalfa so as to enable alfalfa to extract water directly from the atmosphere.

Even the driest air of Earth's deserts contains more parts per million of water than of carbon dioxide, and plants get their carbon from atmospheric CO_2.

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Certain Antarctic lichens and certain desert beetles evolved in ancient times the means to extract water from the atmosphere. O'She-a borrowed the relevant genes from them. She produced the first of the plants—there are many variants now—which can flourish in regions of negligible rainfall.

There was, of course, a bit more to it than simple gene transfer. Her water plants had to pump their water down to their roots to wet the soil and dissolve the water-soluble nutrients they need. But that is old history. She solved all the problems. The twenty or thirty percent of Earth's land area that is desert or semi-desert is rapidly being transformed into fertile territory. The revolution is well on its way. Bannister's Personalized Baronial Fiefdom was an early bit of it.

Water plants alone were not enough to let GBI establish its PBF product line. Other O'She-a inventions, disclosed to me on my visit to her canyon, contributed. Second only to her development of water plants was her work in what she called organic nanotechnology. She and her assistants—she had considerable help—created tiny assembler machines that are halfway to being alive, which can assemble, well, almost anything in the way of foodstuffs and organic products, atom by atom, pretty much from air and water, and very little of anything else.

Incidentally, other assemblers based on her work can do much else. For example, they can turn common clay into aluminum siding for your house. There is a movement among nations to reject the economists' buzz, *competitive advantage,* and become self-sufficient, cut loose from the imperial bondage of trade. O'she-a's nanotechs, now much developed, can produce almost anything almost anywhere, out of rock, soil, air, and water. Perhaps, eventually, she will set everybody free. Then there were her neurochemical inventions, which GBI chose not to exploit. The lady truly was—is—a major inventor.

All of the O'She-a inventions were still not enough to reduce the PBF concept to practice. A few assists, particularly in the solar cell and communications area, were needed. Fortunately GBI Electronics Division was on hand and well organized to provide those items.

Before long, our great corporation was uniquely positioned, patent-wise and in practice, to bring it all together, and set up the Fiefdom product line. Only one thing more was needed—a leader to push the concept.

Shortly before I retired, that leader appeared in the form of a friend of mine, one Ffoulkes FitzHozell.

FitzHozell was a venture capitalist. Much to my surprise, and I am sure to the surprise of many others, he bought GBI. The asking price was in the tens of billions. I had never thought anyone was so rich.

Besides having money, FitzHozell has a rich family history. His remote ancestors, it seems, invaded England with William the Conqueror in 1066. Their descendants played leading roles in the baronial wars of the next few centuries. Perhaps that was one reason why, having secured control, he pushed so hard for the Fiefdom concept. I'm not sure when I first heard of it. The very concept itself may have been his. It was certainly on his initiative that GBI bought up an immense acreage of western scrublands, did some discreet market research, and finally announced PBFs to Wall Street as a bona fide product line.

GBI's PBFs, their advertisements claimed, offered total independence to individuals who wished to secede from the world. In a few to a few hundred acres of land, they would have their own private source of water from their water plants, of food and pretty much anything else in the chemical line from their nanotechs, of electrical power from their solar cells, and whatever they chose in the way of external communications. Their whole Fiefdom would be self-maintaining and self-repairing. No

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external supplies were needed. There would be no costs beyond the initial payment to GBI. There would be an absolute minimum of taxes. And the nanos could provide a Baron with a range of choices that was virtually infinite.

The initial payment was, of course, substantial. Only the very, very rich could afford Fiefdoms.

A favorite admonition of FitzHozell's to his staff was, *Above all else, identify your market!* This was at the root of the *Personalized* aspect of PBFs. A particular market GBI identified, so the grapevine told me, was that group of alienated, youngish individuals who had made their mark (that is, got rich), but had reached a plateau of power, felt insecure, could find no new outlet for their ambitions, and tended to be loners. This was, of course, an accurate description of Bannister, who, despite his competence and ambition, never rose higher in GBI than the presidency of the M & L Division of which he was founder. I believe he became embittered over that lack of promotion. Promoted or not, he had contracted to serve GBI for five years. He served. When his time was up, he quit.

Bannister was then barely middle-aged. Soon after he left GBI, I heard via the corporate grapevine that he had bought one of the first of the corporation's fiefdoms. At the time, I assumed he had become a corporate guinea pig, chosen to test the new product line. If not, he certainly had the financial resources to set himself up as a Baron in his own right.

From there on, I heard nothing more of Bannister from grapevine or any other source, and nor did I expect to, ever again.

And now, here he was in my living room, dripping rainwater, pleading for love.

"Wet clothes off and a hot shower first, Claude," I told him, taking charge. "While you're doing that, I'll make you some coffee."

His fever-eyes blazed. "Class forty, variant twenty two B?"

"Eh?"

"The coffee?"

"It'll be ordinary, made in a percolator, with fresh grounds out of a can."

"How boring! In my Fiefdom I have a choice of more than seven hundred kinds of coffee, synthesized on the spot by my nanos."

"Lucky you." He sounded hypercritical of my limited repertoire. "Perhaps that's your problem. Too many choices. You're messing my carpet. Let me show you to the bathroom."

"But will you love me, Wally?"

"We'll talk about that later. This way, if you please."

I escorted him to the bathroom, started the shower. My shower is old-fashioned. I don't dial it up. I have to adjust it by hand. However, it has a lock on it. I locked it on *tepid*. Didn't trust him not to scald himself.

I left Claude to his own devices, sorted out some old clothes, and returned to the bathroom. He was not yet undressed. He had removed only his jacket. I hoped I would not have to undress him and bathe him by hand.

"Here are clean towels," I told him. "When you're done, put on these old things of mine, and we'll stick your clothes in the drier."

"Thankyou, Wally. Thankyou, thankyou, thankyou!"

He looked about ready to kiss me.

I hurried away.

Safe in my kitchen, I put on coffee to perk.

I went to my living room, glared at my computer with *its* excess of choices, and decided it would be a wasted effort to try to get back into my story. So I went back to the kitchen, picked up some rags, returned to the living room, and set to work wiping the wet from my carpet. Fortunately, despite Bannister's scruffy appearance, it

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proved to be plain water, neither gooey nor, I judged, toxic.

Then I sat down and pawed through a magazine.

Eventually Bannister emerged from the bathroom. My clothes were several sizes too large for him, but with his beard no longer streaked with verdigris and his hair more or less untangled, he looked distinctly more civilized. Indeed, he could pass, I thought, for a hippie poet time-warped from the '60s of the last century.

He remained fever-eyed.

I sat him down, gave him coffee, went to the bathroom, collected his clothes, took them to my laundry room, wondered if I should run them through the washer before drying them, decided they were too tattered to survive an encounter with hot water and detergents, and so popped them into the drier. My drier has the minimum number of choices of any on the market, but it still took me a couple of minutes to tell it what its load was, and how to deal with it. I left it happily twirling.

As I re-entered my living room, Bannister was refilling his coffee cup.

"Best coffee I've tasted for years, Wally," he said.

"Glad you appreciate my humble effort. Just what *has* happened to you, Claude?"

"I've got the Wanderlust."

"So you said. It's a condition, I've heard, to which rich Barons are vulnerable. I know nothing else about it."

"O'She-a never said anything to you? You remember O'She-a?"

"Of course. I can't recall hearing her say anything. Anyway, my association with her occurred long before GBI introduced Fiefdoms."

"But she did know everything, Wally." An oddly wistful expression spread across Bannister's face. He took a long draft of coffee.

"What did she tell you?"

"She told me all about PBFs—not using the name—as you said, it hadn't been thought of yet. She told me I ought to set myself up as a loner in the desert, said it would save me from working myself to death. I did it, too, when Fiefdoms became available."

"You obeyed *She-Who-Must-Be-Obeyed*," I said. "What went wrong? Did she have anything to say about that?"

"Yes. I didn't pay much attention. I was still working hard—a good candidate, like she suggested, to work myself to death."

"As many of our GBI colleagues did." Briefly I mourned. I never did a rigorous study, but I reckon, in the high growth days of GBI, more than half of my bright young inventors died in their early forties, or succumbed to drugs or alcohol. I reckon only one in six or so was truly successful.

"Many died, but not me, Wally. I took good care of myself. I knew *I* was too good a man to die young. Wouldn't you agree?"

"You were good, of your kind."

"Damning me with faint praise, eh? Blast you, Wally Mason. You plotted against me in the old days. Now you're at it again."

"Claude, Claude, calm down. I never plotted against you." But I might have done if he had antagonized me then as I felt he was now trying to do.

"You won't say you love me!"

"How can I? I don't. I don't feel animosity towards you, but love you? It would be a total lie if I said I did."

"Exactly as O'She-a predicted!"

Bannister burst into tears, his shaky hand spilling coffee from his cup.

I crossed the room, took away the coffee cup before he did serious damage to my carpet. Quite uncomfortable with myself and the situation, I tapped him gently on the shoulder.

Presently he bit a finger, stanched the flow of tears, fixed fever-eyes on my face, shook my hand off his shoulder, and practically drove me to return to my own chair.

When I was settled, he continued.

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"O'She-a knew me better than anybody. She said I could never be happy unless I lived in total isolation, with absolute power over my domain. She said technology was on its way such that I need never again connect with any other person."

"And GBI provided you with the technology?" What a perfect target you were, I thought, for GBI's PBF Marketing. At a deeper level, I felt he had got exactly what he deserved. I had not appreciated, until that moment, how strongly I resented his bringing his troubles into my home.

"GBI had a good product to sell, and I bought it." His tone told me he was still a company man at some level. No organization invented by mankind brainwashes individuals as effectively as a large industrial corporation. "At first, I was happy. My barony is in far Utah—three hundred acres of desert—very cheap. O'She-a's water plants turned it green. I loved to choose between the ten thousand species of plant I was able to cultivate. It was wonderful for a time, making choices by day and by night. My fiefdom provides me with more choices than you can imagine, Wally. My breakfast menu alone consists of four-hundred and sixty-two items, served up on demand by my nanos. Choices almost without limit exist in every aspect of my life. GBI Electronics even allows me to choose which part of the solar spectrum I use to generate my electric power."

"What does that do for you?"

"Don't play naïve, Wally Mason. It gives me my own unique, personalized quality of electricity."

"Electronics marketing always possessed a highly creative imagination," I said, dryly. "But you did not stay happy? What went wrong?"

"You're putting me down again."

"Not at all. I'm simply curious."

"So that you can report back to Marketing? Nothing is supposed to go wrong for me. Not ever."

"But something did."

"Now you say it's all my fault." Tears looked about to flow again.

"Not at all, Claude. I'd like to help, but if you won't tell me what happened, I don't see how I can."

"What happened?" He glared at me. "Your stupid company, with its technology, completely filled my days and nights with all the choices I had to make. I believe it was a GBI plot to prevent me from reaching the high office I deserved."

"Why didn't you hire some help, or simply walk away? You are rich."

"My Central Control Console never gave me time."

"I understand PBFs have good communications equipment. Couldn't you contact some of your friends, have them help, throw a few parties, something like that?"

"You're the only friend I have, Wally." I did not feel friendly at the moment, but I could believe that. "You're a nice guy. You say you don't love me, but you will, to save my life."

"I'm not in the rescuing business, Claude. I don't have the skills or training. But I understand how you feel about choices. My computer over there gives me the same problem."

"Don't insult me, comparing your silly little computer with the choices I have as a GBI baron."

"Would you like more coffee?" I asked, coldly.

"I can't decide! I can't make up my mind about anything any more."

"Too bad." I refilled his cup. "Is that what the Wanderlust is—running away from too many choices?"

"You have to." His eyes went blank. "You have to get away, wander across the world, search, search."

"For what?"

"Why, for someone to love you."

"That should not be difficult, for someone who has money."

"You don't understand. The Wanderlust's a lot more than that. It's all pheromones." His eyes hardened. "You

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know that, Wally Mason. O'She-a must have told you."

"I know nothing whatsoever about pheromones." But there was something—a hazy memory, buried deep—not for the moment retrievable.

Bannister actually smiled. "Dear O'She-a. She used to say pheromones do for humans what virtual photons do for electrons. They tell us how to behave."

"Interesting thought. How do they work?"

"Quit pretending ignorance. You know they're subliminal chemical messengers with which living creatures communicate to one another. From birth to death, unconsciously, we use them all the time. O'She-a must have told you that."

"Maybe she did say something." It was coming back to me—a patent—O'She-a's neuro-chemical inventions—a patent we had not filed. I remembered a package in the clutter of my basement—

Bannister glared at me. The pheromones he emitted at that moment, if any he emitted, advised me to get rid of him as soon as possible.

Be tolerant to poor bloody Bannister, I told myself. I asked him what pheromones had to do with his present condition.

"When you're an almighty baron with every moment of your time devoted to making important decisions, you don't meet people, so you don't receive any pheromone inputs. After a time your own output dries up, not that your personal ones would be any good to you."

"So you live a pheromone-free life. What of it?"

O'She-a had said something to me about pheromone deprivation. *"We're analog creatures, Wally, designed to live in a world of grays, to extrapolate large conclusions from minimal data. The subliminal chemical messages we receive from other people help with our extrapolations. In modern times, we try to adjust to a digital world—everything black or white, switches on or off, go or no go. We quit interacting with other people, receive no chemical messages to help us on our way, and then we go cranky."* At the time I missed her point. Now I thought, she was telling me we are all at risk for Wanderlust. Then I thought of my many human contacts, thought I was perfectly safe. Had to be. But alas, Bannister!

I remembered that package she had given me, probably still lying amongst the accumulated odds and ends in my basement—

Bannister was seriously troubled by my question. His response came slowly. "Deprived of pheromones," he said, "you lose your bearings. You don't know what to do. Making decisions gets harder and harder. You lose touch with where you fit in the world."

"So? No doubt your PBF cost a bundle, but you still must be rich. Couldn't you buy some professional help? Have help come visit you?"

"You can't do that, not when you can't make decisions. You only know the only thing that can help is to find somebody to love you. Then you must do what I do, dance about the world like those Medieval people who danced away from the plague, and search, search, search."

"So what can I do to help you?"

"You know very well what you can do, Wally."

"We discussed that already. I can't pretend to feel something I don't feel."

"Do you find me repulsive?"

"Not at all." I did, but I am nothing if not polite.

"I wouldn't blame you if you did. There are good pheromones and bad pheromones. Good ones bring people together. Bad ones push people apart. People like me, with Wanderlust, produce only bad ones."

That sounded about right. However, I still had a mixed-up desire to help him. "Can't you forget you were ever a baron and return to ordinary life?"

"Certainly not! I am not ordinary, nev-

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er was. Nor are any barons. We are a breed of rugged individuals thoroughly able to stand on our own feet under any circumstances. The only thing we can't be is ordinary. I hate you for suggesting it."

Get rid of him, get rid of him, my head kept telling me.

"*Ordinary* is absolutely the only thing you cannot be?"

"That, and somebody someone loves. Without love, we are doomed to wander, alone, forever!" Tears welled up in Bannister's eyes again.

Suddenly he leapt up, grabbed his coffee cup, and dashed it against my living room wall. Dirty brown splotches spread on the delicate pastel-green.

The cup was unbroken.

At that moment I knew the truth. Bannister was insane. Not only that, he was turning violent.

Small rivulets of coffee skittered down the wall onto my carpet.

Bannister glared at me. Was he about to launch a physical attack?

He made a visible effort to control himself, and subsided into his chair again. The fear he had generated in me did not abate. A peaceful individual, I had led a quiet life, and had not had much to do with insanity.

Still, drawing on every scrap of courage I possessed, I managed to offer to drive him to a hospital, or perhaps find him a psychiatrist.

"You'd like to be rid of me, wouldn't you? You truly are a bastard, Wally Mason. It's your fault I'm here."

"My fault? What do you mean?"

"You'll find out." He stood again. A cunning expression of the kind I've seen on actors playing manic-depressives spread across his face. "I know when I'm not wanted. Fetch me my clothes. I'm out of here."

"Whatever you say."

I scuttled off to my laundry room, glad for a chance to be out of there. What to do? Call the police? Run from the house myself?

I rejected the police option. Bannister *had* been a colleague of mine. Loyalty to colleagues had been standard practice throughout my working career. I could not turn him in. Nor could I leave. I did not want my house trashed or burned down.

And so, meekly, and with no particular plan, I removed his clothes from my drier. They were reasonably well done. I tried to fold them, but they were stiff, and would not fold.

I brought them to him.

Bannister took his clothes, gave me the silent treatment, stripped, and began to put on his ancient rags. When he had on his pants, and was buttoning his shirt, he noticed my computer. He crossed to it. "Damned digital bastard," he said, and gave it a sharp blow with his fist. Then he continued dressing.

I was glad he had not grabbed my machine and hurled it at the wall or out the window.

He pulled on his jacket, moved to the open door of my living room, paused, faced me, and once more glared at me with his fever-eyes. "You'll be hearing more, Wally Mason."

"Always glad to hear from you, Claude." That was untrue, but they say you have to humor madmen.

"Then you'll be disappointed. It won't be from me."

"Who'll it be from, then?"

"My lawyer, when I've found one."

"You plan to sue me?"

"Yes."

"What about?" He still looked as if he might rush me. It was less likely, I thought, if I kept him talking.

"I probably should not tell you," he said, "but I'll give you a clue. You remember those neurochemical inventions of O'She-a's which you did not patent?"

"It was a corporate decision. Noonan's. Not mine." But I remembered the inventions. O'She-a had said they might be curative. They might take care of people who suffered from pheromone

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deprivation.

"Blast you again, Wally Mason. You know very well that if you had filed the patents and pushed the inventions, and the O'She-a chemicals had become available to me, I would have been perfectly all right. Damn you, damn you, damn you! Because you didn't file, I and my lawyer will sue you out of every penny you possess. You'll be out on the street."

This, note in passing, was the first and only time in my life that I, who had always filed patents on every invention crossing my desk, was threatened with a suit for *not* filing one!

"No, I won't sue you," said Bannister, a new note of cunning in his voice, "That would be too good for you. You deserve to be done to death!"

Then he was on me. I had braced myself before, in case he charged, but it didn't help. I slammed down into the armchair where he pushed me, a powerless, fat old man, with a maniac on top of me. His hands were about my throat—

"Claude, no!" I squeezed out words. "O'She-a's package—I have—"

"You have what?" He loosed the pressure on my windpipe, pulling away, but still standing over me.

I rubbed my bruised throat. "In my basement—a package—O'She-a said it contained a sample of her neurochemicals—"

My words had a magical effect on him. He grabbed my arm, pulled me erect. "Show me! Show me!"

I guided him down to the basement, led him around my car to one of the alcoves—the one, I was pretty sure, into which I had tossed the O'She-a package. It was cluttered with the unorganized accumulations of many, many years.

Bannister tore into the pile, tossing items left and right, many of them falling on my car. Did he know what he was looking for? Probably so. The O'She-a package, I remembered, had a sunrise golden wrapper. All communications with O'She-a featured a sunrise golden envelope or wrapper.

Happily, so engrossed had Bannister become in his search, that I was able to sidle away, remount the basement stairs, go to my phone, and dial 911. Before Bannister noted my absence, I heard an approaching siren.

Had Bannister heard it, too?

I could hear him still working feverishly in the basement, heavier items clattering on my car. Would he damage it? At any rate, he did not ascend the stairs to check on me.

Police banged violently on my front door. They did not use the doorbell. I guess police procedures say they should not.

I went to the door. Before I could open it, I heard Bannister's footsteps on the basement stairs. "Where are you, Wally?" He came into the passageway to the front door. "I found it! I found it!" His face had changed. The manic depressive had gone out of it. He was almost like the young Bannister of so many years ago.

In his hand he waved a sunrise golden package, torn open.

All this I noted, while I opened the front door.

Two uniformed police officers charged in, guns in one hand, batons in the other. I had reported the situation to the 911 person. They knew exactly what to do. They grabbed Bannister.

Bannister did not react with hostility. He reacted a bit like Ferdinand the Bull—remember?—the one that liked to smell the flowers? He waved the O'She-a package under the police noses.

Immediately the belligerent attitude of the police was defused. They, too, became Ferdinands, holstering their weapons.

Through my open door the storm which still raged outside burst into my house. Shrieking gusts of wind drove cold wet rain all over me. Did I care?

I did not. A sense of euphoria such as I had never before felt swept over me. In that moment, I realized that I loved

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everybody, and everybody loved me. "Gentlemen," I said, " do come into my living room and take a drink."

Such was the power of the O'She-a neurochemicals, of which I had caught but a mere whiff.

We drank together, the police, Claude Bannister, and I. Claude went out into the storm with them, buddy-buddy. He took the O'She-a package with him.

Left alone, I observed the coffee stains on my wall and carpet, and felt good about them. While I'm feeling good, I thought, I had better get on with story I was working at.

I sat at my computer.

Bannister's blow had brought the machine out of its **SLEEP** mode.

I accessed my work and got into it. The machine told me I was doing this wrong, and doing that wrong, told me what was wrong with me.

I loved my computer for its friendly criticism and the good advice it gave me. And it offered such a splendid lot of choices. I was so lucky to have so many choices.

Presently, when euphoria eased off enough to allow me to access my thinking part again, I thought what a wonderful invention that was of O'She-a's, that dear old Bannister had unearthed from my basement. Wouldn't it be marvelous if everybody had access to her chemicals, and could feel as wonderful as I felt at that moment?

O'She-a's invention disclosures, I remembered, remained filed away in the Patent Department, at GBI's Corporate Tower. It was evening in Connecticut, but FitzHozell, who had bought the company, and was my friend, had promised me he would always accept my calls. I went to the telephone, called his home number, and was lucky enough to catch him at home. I told him GBI ought to dig out those old O'She-a disclosures and file patents on them. The inventions, I told him, would be invaluable to his PBF clients.

FitzHozell agreed to follow my advice. He always does.

Only then, as I cradled the telephone, did I remember the disclosure details. O'She-a had invented, not chemicals, not synthetic pheromones, but a pheromone-generating virus. It was infectious and self-replicating. I remembered more. *"You had better watch it, Wally,"* I now recalled her saying. *"If my virus gets loose, everybody on Earth will be infected, and live happily every after!"*

That was the invention that Bannister had let loose upon mankind!

But it was all for the best, all for the very best. ■

(EDITOR'S NOTE: Wally Mason, before his retirement, appeared in several previous *Analog* stories [December 1990, January 1991, July 1991, July 1992, and September 1992].)

READERS: If you are having problems finding *Analog Science Fiction and Fact* at your favorite retailer, we want to help. First let the store manager know that you want the store to carry *Analog*. Then send us a letter or postcard telling us the full name and address of the store (with street name and number, if possible). Write to us at: Analog Science Fiction and Fact, Dept. NS, 6 Prowitt St., Norwalk, CT 06855-1220. Thank you!

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ODDS AND ENDS #2

I've decided it's time to write my second "odds and ends" column (the first appeared in the September 1999 *Analog*), wherein I do some short takes on questions raised about previous columns, or about things I've done recently that merit a mention but not a column, or pretty much anything else I feel like talking about, so long as it fits in with either science or science fiction in some way.

I'm writing this just a few weeks after Chicon, the most recent world science fiction convention. It was in Chicago this year, in the Loop area, and within stone-throwing distance of Lake Michigan. I had not expected to attend this year because I didn't know I'd be living in Michigan again. But once I returned to Grand Rapids, it took little time to decide that a drive down to Chi-town for Worldcon would be just what I needed.

As usual, I shared a room with Bud Sparhawk. He arrived the day before I did, so when I first got to our room, I found a note from him with explicit directions on how to get to the registration desk to pick up my name tag, and how to find the Green room. Now, the problem with a guy like Sparhawk is that he's got a sense of humor (even though you'd never guess this from reading his stories). Though his directions were explicit, there was no guarantee that they would actually lead me to where I wanted to go. Chicon was spread through three adjacent hotels, and Bud's directions were like this (note that these aren't quite the real directions—Bud is so in love with his own writing that he thinks he can sell those somewhere): "Leave our hotel, go north, take the first staircase up, follow the alley, go in the Hyatt, take the escalator on the right down (two levels), go right, go left, go right, left, right, left, and ask the girl in the corner in the harem costume for your badge. Then turn around, take a right at the alien, go up three escalators, turn right, go back down two escalators, walk one quarter mile, and then go up the escalator on the left. The Green room is on the left, get me a cup of coffee, and then look for me in the huckster's room." The directions were good ones, it turned out, and once in the huckster's room I sought out the guy who looks like Ray Bradbury from the back and sure enough, found Bud.

It was a good convention for me, particularly since the summer started with my leaving *Infinite Energy Magazine*, which led to the big move back to Michigan with my family. Someday I will delight in giving a full account of what happened there, but for now I want to spell out that my reasons for leaving had nothing whatsoever to do with my feelings about cold fusion (a subject which I discussed quite a bit in my "Odds and Ends #1" column). I still have no doubt at all that CF is a real phenomenon worthy of serious attention and study, and my former boss Gene Mallove's fact article in the July/August 1997 *Analog* is still a useful place to find out what has happened

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with CF since the announcement made by Pons and Fleischmann in 1989.

But I *have* come to two firm conclusions about CF that were nebulous before I went to work at *IE*. The first of these is that CF experimentation is best left to the experts. If you are a researcher who already has experience in electrochemistry or certain areas of condensed matter physics, *and* if you are willing to put in a lot of time to try to get the experiment right, *and* if you have sufficient money and backing and a good lab, then you can get positive cold fusion results. If you lack any of the above you might still get lucky and get a genuinely positive result, but you probably won't be able to prove it. Getting a positive result is not the same as being able to show that your result *is* positive to a group of your peers—if you don't have all your experimental protocol ducks in a row, you can forget about being taken seriously. CF really suffered by coming so soon after the breakthrough in the 80s that brought us high-temperature superconductors. Given the right recipe, any undergraduate physics student could make those, and verification that one had actually succeeded was only a small supply of liquid nitrogen away. But CF is damn hard to do right. I remain convinced that several researchers, among them Storms and McKubre, *have* been able to do CF right and have vindicated the work of Pons and Fleischmann.

My second conclusion is that, although I think the physics community has really dropped the ball when it comes to CF, I don't think that industry (in general—some companies are supporting CF) has. After ten years, it is still not clear that CF will ever be a competitive way to produce energy, just as hot fusion has yet to produce one sellable joule. Indeed, we already know how to get power from the atom—it's called nuclear power and some countries already get most of their electrical energy that way.

* * *

One of the downsides of Chicon was that the hotel management at the Hyatt saw fit to ration the elevator rides. This meant a long wait in line before being able to get up to the SFWA suite for the usual nightly party, and the weather being sticky, the wait wasn't comfortable either. Even though I was on my way to a party in a room packed wall-to-wall with SFWAns, where perspiration would flow as freely as the adult beverages, I didn't need to practice in line first.

Some of you SF fans may wonder what it is writers talk about at these parties, and the answer to that is: all kinds of stuff. Before going to Chicon, I had felt a bit guilty because, although I'm months behind in my reading of *Analog*, I did find time this summer to read all four of the Harry Potter books (well, it wasn't like I had a *choice* once I started!). But as it turns out, being behind in reading *Analog* seems to be mandatory for *Analog* writers, and most of us have read Harry Potter. This was amongst the "stuff" we talked about.

Another topic that came up, this even closer to home, is the idea that my fiction production has dropped off because I now write the Alternate View (I tried to clear up this notion at the end of my November 1999 column, but a few additional words need to be said). It is true that my fiction production has dropped off *since* I started this column, but not *because* I did. It just so happens that my writing history has coincided with a lot of major life changes. Two weeks after winning the AnLab for my first story, I got married. A year later, my first daughter was born. A bit more than a year after that, we moved to a new house, then my second daughter came along. Two years after that, my son was born. A year later my wife and I changed jobs and we moved to a new state. A year after that, we moved again and switched jobs again. This stuff adds up! My son was born shortly

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after I took over this column, and my oldest wasn't four yet. I also said in the earlier column that I hoped going to work at *Infinite Energy* would free up more time for writing fiction, but that experience turned out to be a stress nightmare. I did, however, manage to revise the manuscript for *Dykstra's War* during that time. Also, I've completed the 1st draft of a short story, and most of a long novella.

At the tail end of my May 2000 Alternate View ("My First UFO"), I told about how my wife had fallen down the stairs with my baby son in her arms and how my mother-in-law, a thousand miles away in Michigan, had dreamed that such a thing would happen the night before. In my column for July/August 2000 ("Five Predictions for Century 21"), I mentioned at the end that I'm a bit concerned about my prediction that time will come to be seen as not existing as a real thing, but simply as change. And the reason I said I was concerned is because I know too many people who have, apparently, seen the future in either dreams or premonitions.

In that May column, I asked readers to send me some of their own personal accounts of premonitions or other psychic stuff, and I got a good number of quality responses. Some of the best material even came from writers who have appeared in *Analog*.

Sometime in the coming months I'll put together an interesting column dealing with those replies, and I want to thank everyone who responded. But for now, as a preliminary to that coming column, I wish to discuss the "observer effect" that exists among the psychic skeptics crowd.

Some skeptics I've encountered are as thoroughly ruled by simple stimulus-response pathways as are the white mice trained in undergraduate psychology laboratories. Indeed, you say "premonition" and with a signal that goes straight from the ear to the mouth without bothering to query the brain, they'll tell you how *everyone* who thinks she's had a premonition is fooling herself, and simply has forgotten all the other times (which it is assumed she's had) where she thought something was going to happen, and it didn't. This response is supposed to close the argument, and the skeptic strongly hints, through his tone or body language, that if this response *hasn't* closed the argument, there's something wrong with you. (I have a fairly unique perspective on this because I've been on both the receiving and the delivery end of this exchange.)

The "observer effect" I referred to has nothing to do with the "psychic" person, but with the skeptic, for it is certain that the average person who has had a psychic experience happen to her is not about to reveal this to someone who is just going to tell her she's nuts. So the observing skeptic thinks he's never run into anyone who has had a genuine psychic experience. But once you factor out the infomercial phonies and their ilk, you're left almost entirely with utterly normal people who "know" darn well that psychic stuff isn't supposed to happen in polite society, yet know that it *has*, to them. So they keep their mouths shut, usually only revealing their stories to others who have odd stories of their own.

My parting words for this month are for you readers who think you've had some kind of psychic experience and wonder if you're alone or if there's something wrong with you. Relax! You're fine.

We have a lot of company.■

Argument seldom convinces anyone contrary to his inclinations.

-Thomas Fuller

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A unique tale of devotion under most unusual circumstances. . . .

PRESSURE GRADIENT

Pete D. Manison

Jayton had seventeen minutes to live. That wasn't long by human standards, but it was an eternity to an AI that processed reality by the millisecond. Still, with the body they'd given him, it was precious little time in which to complete his task.

He used his hardened senses to survey the landing site. Wind-driven sand polished a surface that sloped downward into chaos. The planet they'd christened Coriolis felt like a living entity, a malevolent presence that sought his destruction. It was a world of hellish winds and scorching heat, of rock-vapor clouds and metallic snow. Gravity was twenty times that of Earth, but it wasn't the gravity that would kill him. It was the pressure. Under the dense and exotic atmosphere, his carefully crafted body had to withstand crushing forces greater than those of Earth's deepest ocean.

And down here somewhere, nearby if they'd hit the landing coordinates, lay the wreckage of *Archimedes*.

"Jayton to *Pythagoras*. I'm down. Confirm neutrino link."

A brief pause seemed like hours as his electric mind measured compression on the Remote Excursion Mech's external pressure baffles. There were three sets of baffles, each calculated to last five minutes before collapsing. After that, only the fragile body of the REM itself would remain, naked to the relentless forces of this world.

"Message received . . . Jayton. This is Commander Dacoma. We read you three hundred meters from designated landing site. Not a bull's-eye, but not bad. Can you see the debris field?"

Slow, slow minds up there beyond the ruddy clouds. In the time it took Dacoma to say those words, Jayton plotted a new trajectory to the wreckage based on his corrected position, measured stress levels in the commander's voice, inferred that his real self stood near Dacoma, probably smiling at the accuracy of the mindprint the REM carried. He

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felt like the real Samuel Jayton, even if he knew himself to be nothing more than a sophisticated computer program.

"Negative," he replied. "Moving downslope. Will update at first contact." Then he killed the neutrino transmitter to conserve power. It took a lot to punch a message through the clouds and the magnetic field; he'd need to limit communication to the essential.

Moving downslope, his treads sought purchase on the slippery surface. The valley where *Archimedes* had crashed was typical of the longitudinal grooves carved into the bedrock by the winds. A series of terraces tapered down from the snowcapped mountains to the glistening diamond sand-stream at the bottom. The slope was navigable—barely.

This has to work, Jayton thought as his REM moved with what to his accelerated cognition seemed painful slowness. *I have to find her.*

No one could have survived the crash, but that wasn't the purpose of this one-way mission. If they'd been aboard when *Archimedes* fell into the gravity well, bio-traces would remain in the wreckage. If he found no traces, it meant they were alive, somewhere out there in the asteroid belt. Dacoma would have no choice but to launch a search then, no matter how far behind schedule it put the mission.

Tania.

Fear teased dark imaginings. Too perfect a copy of his mind, perhaps, too susceptible to speculation. Had she died here? Would he learn the truth and then join her in oblivion? No. He was not the real Samuel Jayton. His last act would be to transmit the message that would destroy his true self just as certainly as the pressure of this world would destroy the copy.

She has *to be alive*. Otherwise, what is there?

His REM continued downslope, its senses probing for any sign of debris. His mind spun helplessly as his mechanical body moved, centimeter by centimeter, giving him all too much time to think, to remember . . .

He met Tania at an AI convention in New Tycho City. She looked lost. Luna was her world, but he sensed at once that she was not comfortable in this place. During the meeting he'd noticed her sitting in the back row, apart from the others. Now, at a party designed to let company representatives, scientists and politicians mingle and forge contacts, she stood alone in a corner, holding a drink in her left hand and avoiding eye contact.

"Dr. Jayton, I'm Pyotr Stepanovich. I must say, I enjoyed your speech. As arguably the leading specialist in artificial intelligence, your ideas are—"

"Excuse me," Jayton said, putting a hand on the man's shoulder and smiling. "Can we speak a little later, Dr. Stepanovich?"

"Please, call me Pyotr."

"Pyotr. I read your recent article on engram recycling. Fascinating stuff. Perhaps we could meet for breakfast?"

And so he avoided entanglements as he moved across the room, shaking hands with old acquaintances, accepting compliments with practiced grace, noting the names of people from whom he could learn something and others who would only waste his time. Always, his eyes returned to the woman who stood alone in the corner.

She was younger than he, under thirty, petite with short brown hair and dark, haunted eyes. She was beautiful in an understated way, and her attire hinted at a personality that sought to blend in, to avoid attracting attention. All of this and more he surmised in the seconds before their meeting. Growing up as the eldest son of a diplomat, he'd acquired the skill of sizing people up at a glance. Still, she presented something of a mystery. The banquet hall was unusually warm for Luna, probably a concession to the visiting Earthers, yet she wore a long-sleeved sweater that almost

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covered her gloved hands. She was a native and had to know half the people in the room, yet while they clustered and networked, she remained separate. Deeply etched circles under her eyes hinted at frequent insomnia. What nightmares, Jayton wondered, disturbed her sleep?

"Hi," he said when he'd dodged the last would-be conversant and approached her. "I'm—"

"I know who you are," she said, looking at him briefly and then glancing down, as if eye contact caused her pain. "Dr. Samuel Jayton, head of public relations for Intellitek, son of the special US envoy to the New Arab Alliance, pioneer of smart-systems and, oh yes, I almost forgot, the Solar System's most eligible bachelor."

She had brown eyes, tiny feet and hands. Something about her reminded him of his mother. Perhaps it was the pain she tried so desperately—and failed—to hide.

"Then you have me at a disadvantage, Mrs. . . ."

"*Miss* Tania Waters. I'm here on behalf of my employer, LunaNet."

"And not enjoying yourself very much, by the looks of it."

She looked up again, cringed, looked down. "Tell me, Dr. Jayton, do you always speak to strange women as if you've known them all your life?"

Jayton frowned. "I don't know. Do you ever get anywhere, analyzing every detail before you make a move?"

"And what move would I be contemplating, Dr. Jayton?"

"Please, call me Sam."

She blushed, and he noted the healthy glow to her skin, the inner beauty that sought in vain to reach the surface. "There are more influential people here, Sam. Perhaps it would benefit you more to spend your time impressing *them*."

"Maybe it wasn't on behalf of Intellitek that I approached you."

"In that case I would say there are more beautiful women for you to add to your list of conquests."

Jayton smiled. So there was fire beneath the ice. "Admit it, Tania. You're intrigued by me and a little afraid. Let's play a game, shall we? You grew up in the work-camps, the only child of Earth immigrants who sought a new life on Luna but found that by the time they'd worked their way out of their indentured servitude their bodies were so riddled with cancer from the low-quality shielding they used in those early days that they could only hope to see their dream fulfilled through their daughter."

She glared at him hotly. "You're not the only one with a degree in psychology, Dr. Jayton."

"Sam."

"It comes with the AI curriculum. You grew up with so much wealth that you take your privileged lifestyle completely for granted. As the son of a diplomat, you're good at working people, but because your father wasn't demonstrative of his feelings you never learned to connect with others on an emotional level. What the world sees of you is a carefully constructed shell. What's inside is nothing."

"Ouch. I've awakened the beast. Would you like to get out of here? I *am* the guest of honor, after all. Perhaps you could show me a little of your world."

"You're joking."

"Not at all. Unless you're afraid to find out you're wrong about me."

She hesitated. He tried to touch her arm; physical contact usually warmed people to him more than words. She jerked back, pulling the sleeve of her sweater down almost fast enough to cover the gleaming metal it had been intended to conceal.

"Very well," she said at last, mustering a challenging smile. "But don't expect to get me into your bed tonight. I'm not some starry-eyed groupie."

He followed her, shaking his head. "I noticed."

At last he'd reached the edge of the

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debris field. Six months of wind erosion had left little that was recognizable of the once proud starship. Polished bits of titanium and diamond-coated aluminum remained where softer materials had been eroded. A long gouge in the landscape indicated that the bulk of *Archimedes* had survived the impact, but much of the debris had either slipped down the incline or been blown downwind or boiled into vapor by the heat. The pieces got larger as Jayton moved into the field, but any surviving compartments had imploded to blocks of solid metal.

He stopped, adjusting parameters. Despite the data *Pythagoras* had gathered from orbit, he had clung to the hope that there might be survivors. That was clearly impossible. Anyone aboard would have died on impact or in the first seconds thereafter.

Jayton checked his internal chronometer. Fourteen minutes, twelve seconds remaining. He could feel the pressure mounting as he descended past one gradient and then another. The REM was equipped with tactile sensors, and the sensation reminded him of being under water, far too *deep* under water, as if a huge weight pressed down on him from every direction.

He approached a fragment of debris, extended a manipulator to take a scraping. The arm began registering abrasion the instant he extended it, so he worked quickly, securing a small sample and depositing it into his built-in analyzer. He retracted the arm, held his breath as the chamber broke down the sample, analyzing it molecule by molecule. Only when the readout scrolled past his eyes did he allow himself a sigh of relief.

No bio-traces. It wasn't conclusive proof, but it was enough to give him hope.

He checked the chronometer again. All of this had taken less than a minute, though it had seemed far longer. As his mind seethed with activity, the slowness of his body continued to frustrate him. He'd have to take more samples, analyze them, gather enough evidence to convince Dacoma before—

His body shuddered with sudden violence. A crunching sound was followed by the hiss of escaping gas and the sensation of a giant hand squeezing him. He'd lost the outer baffles, right on schedule. Two more layers to go, and he would meet this world for true.

Often she would awaken in the night, screaming. Even after two years of marriage, Tania remained in many ways a mystery.

"Honey? It's all right. It was only a dream."

She clung to him with her good arm, carefully keeping the other hidden under the blanket. He could feel her tears against his bare shoulder.

"Can we talk about it?" he asked.

She shook her head no.

"Tania, please. You've given me so much. Remember the conference where we met? You were right about me—I was just an empty shell of a man. You gave me a soul. Now it's my turn. Let me help you."

She shuddered, still crying.

"The accident happened a long time ago." He could have said more: that technophobia in an AI expert was a contradiction that had to be resolved, that she'd let him learn every inch of her body except that part which defined her most of all. He said none of this. He only reached out, as he often had, and tried to demonstrate through action that what repulsed her was, in its own way, beautiful.

She screamed, twisting away from him, cradling her robotic arm like an infant against her breast.

"Jayton here."

That was a disconcerting sensation. "Jayton here, too. How are things above the clouds?"

There was a pause as they decompressed his signal. Then, over the neu-

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trino link, came a chuckle. "*Pythagoras* is fine. It's only been seven minutes, after all."

"Is that all? Feels like months."

He pictured himself, tall and confident, leaning past Dacoma at the comm station. Strangely, *that* Samuel Jayton seemed like the impostor. Despite his REM body, he felt like the real thing—all memories intact, every nuance of thought and action consistent with everything he remembered from a life that stretched unbroken back to Luna, to Earth.

"Enough chit-chat, Sam. I always did talk too much. What's the situation down there?"

He could hear the tension in his other voice, the fear of what the answer would be. It relieved him that he had good news to report. "No bio-traces. Tell Dacoma he can begin the search. They weren't aboard when *Archimedes* went down."

While they digested that and prepared to reply, Jayton had time to follow the logical progression. Jayton: "Then she's alive." Dacoma: "We don't know that." Jayton: "No bio-traces means they abandoned ship before impact." Dacoma: "Even if they did, it'll be like finding a hundred needles in a million haystacks. The asteroid field is far denser than Sol's. With radio contact limited to short-range by the flares—" Jayton: "The pods can sustain them indefinitely. With the asteroids as a matter source and the sun for energy, there's no reason to believe they aren't still alive."

"Understood," was all the real Jayton said, high above in *Pythagoras*. "I'm putting Dacoma on now."

"Sure thing, old buddy. Keep your chin up. Something tells me this will have a happy ending."

There was no reply, and an eternity seemed to pass before Commander Dacoma's voice came over the link. "Good work . . . Jayton. Have you located the black box?"

"Negative. That's next on the agenda."

"I read less than ten minutes left for you down there. What's your condition?"

Jayton sent a diagnostic pulse through his systems, analyzed the result in the time it took Dacoma to finish asking the question. "I'm fit as a fiddle, Commander. The outer baffles imploded on schedule. The second set should go at any time. Internal structure holding."

"Very well. Continue search. Dacoma out."

And as quickly as that, he was alone again. From this vantage he could see down into the valley. To the west, a great vortex spun like a top, its rock-vapor clouds so thick it looked like a solid object. Permanent features not unlike Jupiter's Great Red Spot, such vortices were Coriolis' slow suicide as they cut like drills through the bedrock. One day they would breach the crust, releasing magma that would totally resurface this world.

Below, another terrace sparkled with fragments of debris that had slipped down the canyon wall. And below that, past the final terrace, the diamond sandstream shimmered like a clear mountain creek.

Jayton paused in his scan. Anomalous readings had bedeviled him since entering the debris field. Fragment distribution was off, as if pieces had been moved. Surface markings should have been erased by wind erosion, yet he had found a number of indentations that looked as if they had been recently formed. Shifting of the debris? It was the simplest explanation, but he sensed an underlying order that contradicted this conclusion.

And now, on the terrace below him, he detected motion.

Life on this hellish world? Impossible. Wasn't it? Temperatures hotter than those on the sunward face of Mercury. Winds higher than those of the fiercest Martian sandstorm. Gravity and pressure in excess of anything an Earthly organ-

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ism could survive.

There it was again. He uncapped his telescope, risking its lens long enough to sneak a peak between two chunks of *Archimedes'* hull, where something small and angular traced the one path he could not dismiss as natural: a straight line.

He waited for her in their apartment in New Tycho City, going over and over it in his mind, searching for an easy way to break the news. It had been a glorious five years. The training program had consumed them, challenged their weaknesses and strengthened their strengths, and at last the launch date approached. Humanity had never embarked upon a greater adventure, and they would be a part of it—the first human beings to colonize a planet of another star. Celebrations raged all over Luna, and on Earth too, but Jayton feared that tonight would not prove as festive an occasion for the two of them.

Beyond the window, the cratered plains glowed under the sun, stretching away from the rim of Tycho and on to the horizon. Luna had come to feel like home to Jayton. Leaving it behind would have brought sorrow enough. Now, with the secret he carried, that sorrow was multiplied a thousandfold.

It will be hardest on her, he thought. The psych tests had exposed Tania's emotional scars. Jayton had pulled the necessary strings to get her accepted for the mission anyway, assuaging the doubts of the team psychologists. His own doubts were harder to dismiss, but deep down he had faith that Tania would eventually overcome her demons.

And now this.

Above the horizon, the twin stars of *Archimedes* and *Pythagoras* hung like two eyes looking down on him. Sister ships on a grand voyage, each would carry a crew of a thousand with a million frozen embryos waiting to be animated once the colony was up and running. *Archimedes* would launch first, only a week from now; *Pythagoras* would follow six months later.

I tried, Jayton told himself. *I did everything I could to have the decision reversed.* For once in his life, his powers of persuasion had failed him. Both he and Tania were experts in the same field. Redundancy protocols demanded that they be assigned to separate ships, so that in the event of catastrophe at least one AI specialist would remain in the new colony.

The door beeped, signaling Tania's presence. Jayton crossed the living room to meet her, then stopped halfway, gasping in surprise. She wore a Fairy Queen costume, pink wings spreading from her tiny frame, glitterdust painted in subtle stripes across her cheeks. She crossed to him with that quick-shuffle walk only Lunar natives ever completely mastered, and they came together in a fierce spinning hug that left him breathless.

"You're not celebrating?" she asked when they drew apart at last. Her smile was angelic.

"No, I . . ."

"Great. Now I feel ridiculously overdressed. Never mind. We can do something about that." She began to peel away her costume, letting the wings float softly to the floor, slipping the straps of her pink leotard over her shoulders.

"Tania, wait. There's something . . ."

Her eyes widened, so deep and clear, the happy sparkle fading to reveal the troubled brown depths that were never far beneath. "What is it? What's wrong?"

He took her hand and led her to the window. He'd practiced telling her in this spot overlooking the home they would soon leave behind, and he hoped that the physical location would help him now that it was time for the real thing. It didn't.

"There's been a last-minute change of assignments," Jayton said. "I won't be aboard *Archimedes* with you. They're holding me back with *Pythagoras*."

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He expected a thousand questions, but she only blinked up at him, that same delicate, vulnerable creature with whom he had fallen in love. "No," she whispered.

He clenched his jaw muscles, ground his teeth together. How he had sought to protect her these seven years of their marriage. How he had struggled to help her learn to trust again—in others, in herself. Would this single event begin the unraveling of all they had accomplished?

"It's all right," he said, taking her good hand. "It's only six months. They need the time to accumulate enough energy to spin a second wormhole. Then I'll be there."

"Sam."

"Hell, you'll all be so busy setting up the colony base, it'll pass in no time."

"Sam."

"Don't worry about me. We've got a lot of work to do on *Pythagoras*, and—"

She clung to him, silencing him, and the cold stiffness of her body told him that his worst fears had been correct.

"Tania? Is that you?"

The thing had run from him when he'd approached it, which had been his first clue. How like Tania to seek safety from confrontation. As he'd followed the other REM, his accelerated mind had followed the threads of logic to the inevitable conclusion. Just as *Pythagoras* had constructed a REM capable of surviving here, if only briefly, so must *Archimedes* have chosen the same path. Just as his mindprint, as leading AI specialist, had been encoded into the machine, so must hers have been encoded, to wait here, to somehow survive to let the rescue teams know what fate had befallen the crew of the doomed starship.

But survive how? The best engineers on *Pythagoras* had labored long hours to come up with a design that could withstand this environment mere minutes. That she was here, in a REM that still functioned after six months, seemed impossible. Could she have been waiting in orbit, landing only when she detected his presence? No, *Pythagoras* would have spotted her. Had she found a surviving fragment of *Archimedes* large enough to shelter her? Again, it would have been detected.

So many questions, not the least of which was: why was she running?

"Tania, wait! It's me!"

At close range, radio communication should have been possible between the two REMs. Listening to the static, Jayton waited for a response. At this lower elevation, the pressure was even greater than before. The second set of baffles had imploded halfway down the slope, and his adjusted calculations showed less than four minutes remaining before the third and final set gave way. He pursued the mysterious REM doggedly, his only thought that here, at last, he had found her. Separated by light-years, they would finally be reunited, even if it was in bodies of metal instead of flesh.

Tania, how I've missed you. How I feared that I'd lost you. Come back, my love. Don't run from me now.

As if hearing his thoughts, the other REM slowed, allowing him to close the gap, and then stopped. Slowly it turned to face him. Six months on this world should have reduced the mech to a hunk of inert metal. Yet its outer baffles were intact, its design much like his own. In its manipulators it clutched a sheet of titanium alloy salvaged from the wreckage.

"Sam?" It was a whisper from his radio receiver. Thank God he hadn't yanked it as he'd intended. Useless at any range in this environment, it was a waste of space and weight. Yet something had told him to leave it in place.

"Sam? Am I dreaming? Have you finally come?"

Analog emotions or real ones? Virtual feelings or true? Did it matter? He was Samuel Jayton, in every way that mattered, and at the sound of that voice he

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wept inside, wept with joy and relief as he allowed himself to feel all the things he had held so carefully at bay: the fear that he had lost her forever, the certainty that without her his soul would wither and die, returning him to what he had been before.

He rolled toward her, each second an eternity.

The boarding call for the last shuttle to *Archimedes* had sounded. Only now, as he held her close in the crowded terminal, did the reality of it all hit him.

"I'll miss you terribly," he said.

She lifted her chin, smiling past the tears. "I'll be fine." Her eyes told him it was a lie.

"It's not too late to change our minds," he said. They were empty words, and both of them knew it.

"Sam, I'm afraid."

This was not how it should be. They'd planned on the voyage together, trained for five years on that assumption. How like the bureaucrats to jerk the rug out from under their feet at the last moment.

"I know," he said, brushing tears from her cheek. "At least give me something to remember until we meet again."

She grinned. "I thought I did that last night."

He smiled. "Something else. Something to let me know you'll be at peace."

She sensed his direction, lowered her right hand. "Sam, please. Not now."

"But it's part of you. Until you accept that, you'll never be free."

The nightmares had never ceased, though they had diminished in frequency over the years. Now he felt that a simple touch could bring the final healing that would make her whole, so that if something happened, if he never joined her on that new world, she could continue without him.

He reached down, took her metal arm in his hand, raised her metal hand to his lips. He lowered his face to kiss her there, but at the last instant she yanked the hand away, tucking it into the pocket of her uniform.

"Good-bye, husband."

And she was gone, down the boarding tube, hidden in seconds by the crowd of embarking passengers.

They communicated at high speed, exchanging in seconds the data that had taken months to accumulate. With their I/O ports connected, there were none of the limitations of the fragile radio link.

"What happened to *Archimedes?*"

"The wormhole was off-target. We came out into normal space too near the gravity well of this planet."

"Coriolis."

"Is that what you're calling it? How's *Pythagoras?*"

"Behind schedule. When we didn't find you on Elysium we traced your drive trail here. Dacoma's holding the colonization mission until we determine whether there were survivors."

"Then you can communicate with them? How'd you manage that?"

"Neutrino link. We cobbled it together at the last minute."

"Ingenious. By now you've figured out we weren't aboard *Archimedes* when she crashed. We used the escape pods and headed for the asteroid belt. You'll find us there."

"I know. But without the black box telemetry, it could take years to track you all down."

"Still, you won't just *leave* us out there."

"Tania, it's me. I've missed you. I thought—"

"Don't do this, Sam. You have no idea what it's been like for me. Six months alone here. I had to do it; there was no other way to be sure you'd get the message. But that six months seemed like decades."

"How did you survive?"

Her REM turned ninety degrees to the west, and she raised a manipulator to point to the roiling rock-vapor clouds of the vortex.

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"You're kidding."

"Not at all. The pressure inside is significantly lower than it is out here. I scavenged materials from the debris to repair my REM as needed. Which, by the way, might not be a bad idea for you. Look at yourself."

He did. The crushed outer baffles gave his exterior the appearance of a discarded tin can. His manipulators and sensory clusters were scarred by windblown sand. "I always was a handsome devil," he said.

She chuckled. "It really *is* you," she said, and in that instant Jayton knew that, whatever hardships she had endured, the real Tania was still alive inside there.

"How did you do it?" he asked.

He could almost see her haunted brown eyes looking up at him. "Oh, Sam, it was horrible. I ran memory replays at first, but it hurt too much when I came out of them to find myself alone here. I tried taking my higher brain functions off-line and setting a timer to reactivate them at intervals. But I had to keep repairing myself, and whenever I went off-line there was the risk I'd stay off too long, accumulate more damage than I could repair."

"My poor darling." He moved forward, extending a manipulator toward her. She shrank away, so like the flesh and blood version.

"No."

"Tania, you can't still be—"

"Leave me alone!"

He understood. While he enjoyed the capabilities of his REM body, she would feel trapped in the metal, a prisoner of her darkest nightmares.

"It's OK, honey. I'm here now. And soon it will be finished."

She hesitated, lifted a lens to regard him. "What do you mean?"

"You said it yourself. I'm looking pretty shabby. Four more minutes, give or take, and I'm a goner. So where's the black box?"

Tania hesitated, as if contemplating some complex equation. Then she turned, moving her REM forward to where the terrace ended and the slope plunged down to the diamond sandstream. She extended her manipulator.

"There."

Jayton threw himself into his work. There was no such thing as overpreparing for such an endeavor, and by concentrating his attention on the mission profile he avoided dwelling on Tania's absence.

The target world was Elysium, an Earth-like planet circling a star two hundred light-years from Sol. Telescopic analysis had revealed a dense asteroid belt sunward and a larger planet in a tight orbit around the star. The technology that allowed the opening of wormholes demanded tremendous energy, necessitating the delay before *Pythagoras* could launch. In that time, *Archimedes* would have erected the first colony structures, surveyed the new world in detail, and set up the beginnings of mining and agriculture. When *Pythagoras* arrived, she would contribute her crew and materials, accelerating the process.

Nights were the worst. Alone in his apartment, Jayton looked out over the lunar landscape and wondered what Tania was doing. He had closed off his emotional core in her absence. It was what she had given him, but in her absence it could only bring pain. Now he felt like his old self, discipline taking the place of compassion, mind taking control back from heart. It was no way to live, he now saw, but it was the only way he knew.

How, he wondered, had she changed herself to weather the long months of their separation?

And then, at last, the day arrived. Aboard *Pythagoras*, Jayton looked out at the stars that would be his new home. With Luna dropping out of sight behind him, he finally allowed himself to feel the hope, the anticipation of seeing her again.

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Just a little longer, he promised her, promised himself. *Whatever happens, we'll never part again.*

That helped with the fear, but only a little.

"Listen to what you're saying!" Tania screeched. "You want to go down into *that?*"

From the edge of the final terrace, the sand-stream resembled cold, clear water. Its beauty, Jayton knew, concealed death. Beneath that grinding layer of diamond dust, the pressure would be incredible. Even if they survived the passage . . .

"We have to try," he said. "A thousand lives depend on it."

Tania kept her REM parked on the edge two meters away from him, backing away whenever he tried to draw closer. After the long search, he wanted to hold her, to comfort her, to do so many things that were impossible in these bodies.

"What *about* us?" she finally asked.

Jayton turned. "What about us? We're just robots, Tania, no matter how much it may feel otherwise. The real Tania is in an escape pod, clinging to life and praying for rescue. The real Sam is up there in *Pythagoras*, going out of his mind wondering if she's still alive. I know you've been down here a long time, but—"

"You don't know anything! *I* am Tania Jayton. I've waited here alone, waited for you to find me. And now that we're together again, you want to throw it all away."

"Throw *what* away? We're doomed anyway. The pressure—"

"You're forgetting the vortex. If I survived in there, we both can. There's plenty of raw materials left from the wreckage. It's immortality, Sam. You and me together forever."

"In robot bodies."

That silenced her. And it gave him the answer, cruel as it seemed. Brief pain washed through him at the thought of her suffering, the memories of her waking in the night, clutching her arm and screaming. She'd only been twelve when the Tycho blowout that had claimed so many lives had taken her arm. The scars of that event were evident even in the mindprint her REM carried.

"Tania, we have a choice. We can retrieve the black box and save all those lives—those real flesh and blood lives—or we can stay here together forever, imprisoned in mechanical bodies, trapped in shells of metal and electronic circuitry."

"Sam, don't."

"Or maybe I'll do it myself. I can probably survive the sand-stream, get the box, use the neutrino link to relay the pod telemetry to *Pythagoras*. You can go on as long as you like, with treads instead of legs, manipulators instead of arms—"

She whirled on him, her lens flashing in the sunlight. "Damn you! I *love* you—don't you get it? Every day here was like a year to me. All I did was think about you—about how we met, fell in love, got married. About how you helped me face my fears and—"

"And what? Remember when you launched out on *Archimedes?* Even then you wouldn't let me through that shell you use to protect your phobia. You were just a frightened little girl. You still are."

"Sam, no."

"Not even a little girl. The encoded personality of a little girl driven by fusion and fear. Fear of admitting what you are. *Look* at yourself. You're not a woman; you're a machine."

She froze, and for a moment he thought he'd gone too far. He checked his internal chronometer. No time for subtlety. One way or another, he would be dead in two minutes. Even now he could feel the final pressure baffles fatiguing, nearing the point of implosion.

"Tania, you have to be bigger than this. It's time to grow up and think of

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someone else for a change. A lot of people are depending on you. Sam and Tania are depending on you. They can be reunited, live the rest of their lives on their new Earth, raise children, laugh and love, grow old together. Or she can die in that pod, and he can go back to being what he was before he met you—soulless and alone. It's your choice."

He gave her a second to picture it, knowing that in that time she would actually *live* that future, every detail, her accelerated processor projecting every nuance.

Then he turned from her and moved forward, onto the long incline that ended in shimmering death.

"We knew there was a risk," Dacoma said. He was Jayton's match in height but ten years his senior, broader through the midsection, narrower through the shoulders. "There's considerable uncertainty as to the wormhole's exit point. They just got unlucky."

Jayton hadn't emerged from his quarters since the discovery of the wreckage of *Archimedes* strewn across the surface of the system's inner planet. He felt dead inside. Those first moments, anticipation going to fear, fear to grim realization, had burned out his capacity to feel anything.

"If it's any consolation, you aren't the only crewmember who had loved ones on *Archimedes*."

Jayton remained on the bunk, where he had sat motionless for hours now, maybe days. "That's supposed to make me feel better?"

Dacoma took a cautious step forward. "Jayton. Sam. I'm sorry for your loss—truly sorry. But you're one of the most important people on board. I need you."

Jayton shook his head. "I'm afraid I wouldn't be much use to you right now, Commander."

"We've been analyzing the data from the crash site," Dacoma said, continuing as if he hadn't heard. "We believe *Archimedes* launched an orbital beacon, but that they were too far down the gravity well. Its orbit decayed until it burned up in the atmosphere."

An image of fire flashed through Jayton's mind. He saw Tania huddling in her quarters, seeking safety as she always did, only this time there was no place to hide. Flames heated the door, trapping her there. The walls began to glow white.

"*Archimedes* was equipped with escape pods the same as *Pythagoras*. They may have launched in time to break free."

His mind felt numb. He heard what Dacoma said, but he didn't dare hope. Better to accept reality than to search for ways to deny it. "No, Commander. She's dead. I can feel it."

Dacoma put his hand on Jayton's shoulder. "Sam, don't do this to yourself. You're one of the strongest men I know. I need your help."

Jayton looked up, said nothing.

"Radio interference makes it impossible to contact the pods. With Elysium out of range, the asteroid belt would have been the logical destination. But without more solid information, it would take years to conduct a thorough search. I can't authorize such a delay in our mission without evidence that they abandoned ship."

Jayton rose at last, flexing stiff joints. "What do you want from me, Commander? Either they died or they didn't. We can't put a lander on the surface—not at those pressures. We'll never know for certain what happened to them."

The light in Dacoma's eyes was frightening. "You're wrong, Sam. There may be a way."

Light and sound, searing heat. The last pressure baffles imploded, were swept away by the grinding sand. Jayton protected his internal systems as best he could, dropping through the sandstream with his lenses covered and his manipulators retracted. The neutrino transmitter was his primary concern: if

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it didn't survive the transit, there would be no way of contacting *Archimedes* even if he did recover the black box.

His treads slipped. He could feel the stream trying to take him, to carry him along with it, but he extended a manipulator to steady himself. It worked, and it didn't. He regained his balance long enough to drop through the worst of it, but just as he was clearing the lowest layer of diamond dust he felt the manipulator twisted up and away from his body, torn from its socket and swept away into the chaos.

There was other damage. In the pressurized gas cushion beneath the sand-stream, Jayton came to rest in an upright position, but when he sent the command to move, the treads failed to respond. He'd burned out his drive train on the way down.

Great, he thought. Here he was, stripped of his armor, pressure crushing one component after another, with no way to move or grasp, helpless. He uncovered his lens and looked around. Tania's estimate of the black box's location had been faultless: it lay less than twenty meters from where he sat. By virtue of its super-dense construction and nanodiamond shell, it was still intact, protected from the elements. But he had no way of reaching it.

His lens cracked, turning the view into a kaleidoscopic image that was barely comprehensible. Something popped, and he found he had lost rotational control. A quick diagnostic showed the neutrino transmitter intact, protected in the depths of the REM. For thirty seconds, at least. Then he would be crushed as the inner hull succumbed to the pressure.

Tania, where are you?

Had he said enough? Had he said too much? There were all kinds of pressure. It could be a driving force, or it could crush the life out of you.

Twenty seconds.

At least we tried, Jayton thought. *And we came so close.*

These final seconds stretched into infinity. His processor ran scenarios, projected outcomes, but he found no comfort in any of it. They had failed. Perhaps some of the crew of *Archimedes* would be rescued anyway. Most likely, all would perish.

Tania. He'd tried to protect her, to save her from her own darkness, and the worst part was that he'd been succeeding. Little by little, he had brought her closer to accepting her disability and moving forward with her life. Now it was all gone, and there was nothing he could do about it.

Fifteen seconds.

Pressure held him motionless here, though just overhead the raging wind swept by, friction lighting the diamond dust from within, bathing this deepest place in a faint reddish glow. Jayton was thinking this would be the last thing he ever saw when something dropped through the sand-stream in front of him, landed near the black box.

Tania!

"Thought you could use a hand," she said over the radio link. He tried to respond, but her antenna had been sheared away. Her REM had suffered other damage, though its newly fitted baffles had absorbed the brunt of it. Jayton watched as she moved forward, clasped the black box in one of her manipulators, and turned toward him.

Ten seconds.

Her outer baffles imploded, and the force of the implosion wrecked the second set. He feared the chain reaction would destroy her, but she continued toward him, ignoring the erosion of her body that accelerated with every meter.

And then, at last, she was there. She extended her manipulator toward him, and he used his last surviving data port to access the black box's computer. It was there: pod trajectories, estimated survival times, crew assignments. They had made it, all of them, the last pods departing *Archimedes* in the final moments before impact.

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Jayton smiled. Then he powered the neutrino transmitter and sent one final message up through the clouds to *Pythagoras*.

It was the hardest thing he had ever had to do. Programming the REM with a copy of his own memories, his own brain patterns and emotional responses was like giving birth to a child. The sophistication of the AI made it indistinguishable from his true self.

And now he was sending it to its death.

"I wish we'd had more time for testing," Jayton said, watching with Dacoma from the bridge of *Pythagoras* as the countdown began. Beneath them, Coriolis swirled with its fierce cloud bands, its spinning vortices, looking like the physical incarnation of hell.

Dacoma said nothing. There had been some concern over using Jayton's mindprint for the REM. Dacoma had feared his personal involvement might cloud his judgment. Now the time for doubt had passed, and Dacoma projected confidence as he stood at Jayton's side.

"Three, two, one. Ignition. The REM has left the bay."

Jayton watched as the tiny light arced across the disk of the planet, its heat shield glowing as it entered the thick atmosphere. Was there cause for hope? He would know soon enough.

"Good luck, Sam," he whispered.

DATA RECEIVED was the last message to come across the neutrino link before it collapsed.

"We did it," Tania sighed. She'd connected their processors through his surviving port, and Jayton marveled at her beauty as he never had before.

"I love you," he said.

He was blind now, crippled, as one system after another succumbed to the inevitable forces of this world. In the last seconds, as their minds touched, he felt contentment.

"We did a good thing," he told her.

Tania was silent for what seemed an eternity. Her own REM was only seconds from failure, its baffles gone, its structural members as exposed as his were. He saw her thoughts, and he knew her fears.

"They'll be fine," he assured her. "They'll never know about us, but in time they'll follow the same path. She'll supply him with a soul; he'll heal her deepest wounds. And they'll have all the time in the world for the rest."

Inside her mind, Tania smiled. "I love you, husband. Thank you for coming back for me."

Only a stump remained of his manipulator, but Jayton extended it as far as he could, hoping. After a moment she responded, taking hold of him with her robotic arm, closing metal fingers around his extended limb.

Hand in hand, they waited for the end of it. ■

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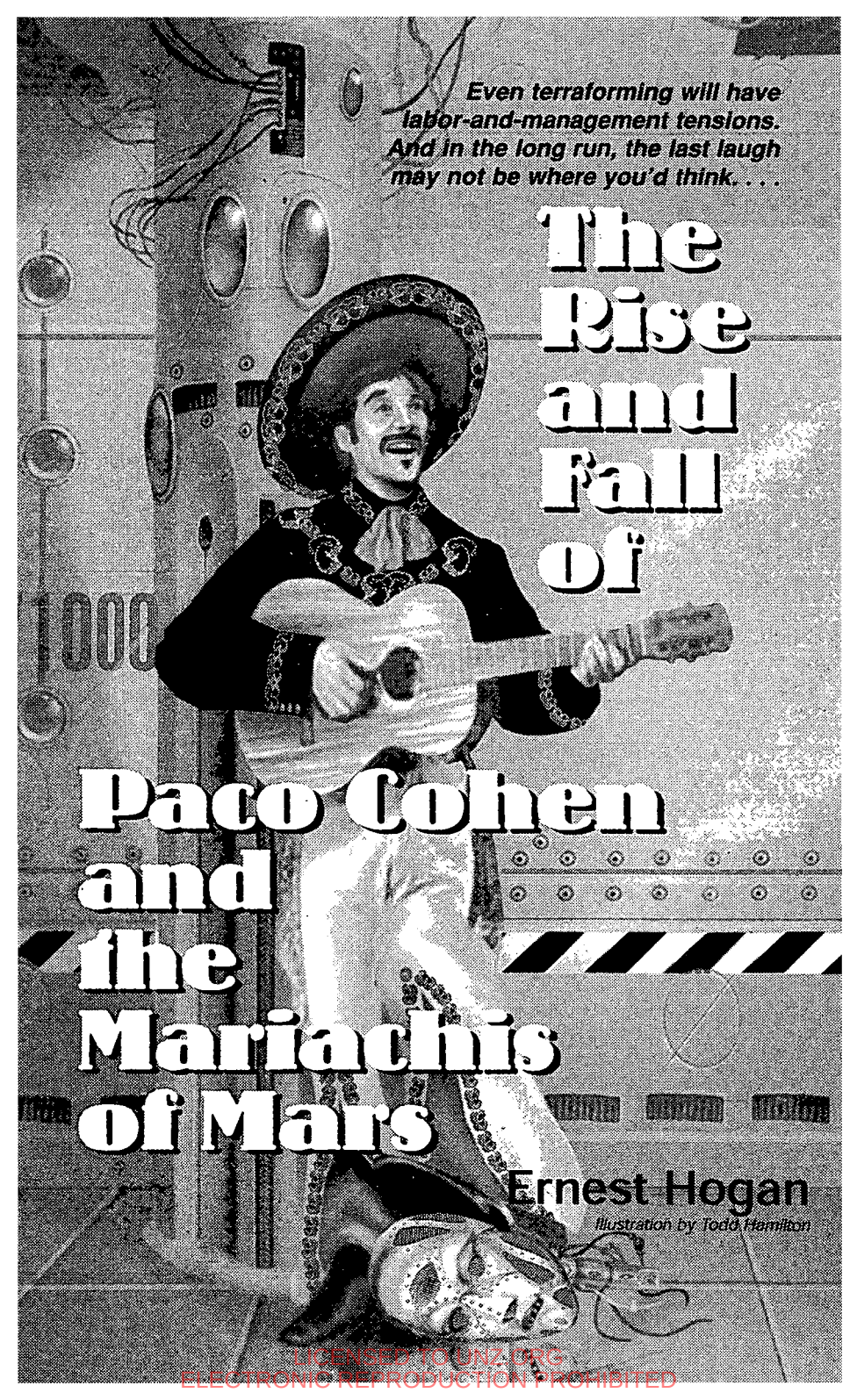
Even terraforming will have labor-and-management tensions. And in the long run, the last laugh may not be where you'd think. . . .
The Rise and Fall of
Paco Cohen and the Mariachis of Mars
Ernest Hogan
Illustration by Todd Hamilton

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Yeah, I know, I don't look like him. But then again, who or what is Paco Cohen, anyway? Was he that kid born in Texas, or the myth created on Mars? Maybe I don't look like the hologram that sings my songs, but I kind of sound like Paco Cohen—if he were ripped to shreds and sloppily put back together again.

When they tried to destroy me, they only succeeded in transforming me. My voice was damaged, so now there's gravel in my growl and it's deeper. But it's still me. That which did not kill me, made me a living godlike myth-figure. It's your basic death and transfiguration schtick.

You never how things are going to change. Like the nanohudu chewing on Mars. They were supposed to make an engineered ecosystem, but when you build an ecosystem from the microbes up, the unexpected happens, and soon strange NeoMartian things wander the planet. New life forms, like tigotes, razorweeds, dragon mosquitoes, vampire cactus, and me.

Anyway, my transformation started around the time that purps were being killed by razorweeds, forcing the authorities to officially recognize that razorweeds existed in the first place. It all came to a head that night the cucarachas went berserk and killed the best damn Elvis robot in New Las Vegas. Their state-of-the-art programming was too stupid to pick out trash from nontrash. I suppose they're not so different from the human brain in that regard. They scanned the cavernous Graceland Executive Lounge, read Elvis as trash, swarmed over and proceeded to dismantle him for recycling. A leg gave way. He crashed off his pedestal and shattered into several pieces before anyone noticed what was going on.

Secretly, we all felt good about it. Once again, an attempt to automate us out of our jobs failed. They would still need us purple peons to do the dirty work here on Mars.

"Kill the cucarachas," I radioed control. "They just killed Elvis."

The unpurp in charge growled with disappointment.

The rest of the cleaning crew and I dropped our dustsuckers and went over to assess the damage as the cucarachas finished their dismantling and retreated in a neat formation, momentarily looking more like the tiny robots they were than the insects they appeared to be.

By some miracle—maybe even the spirit of Elvis himself—the self-contained acoustic guitar survived the fall without so much as a scratch. I picked it up. My dear, lovely Coreena gave me that disapproving look she always got when I was about to do something stupid—it melted into a smile, as usual. I adjusted the guitar back into tune and sang a song from my Mexamerican childhood, "La Cucaracha," in my best Elvis voice. The rest of the custodial crew applauded. Coreena let loose with her wonky horse-laugh.

Then they suddenly went silent.

My fingers poised over the strings, I paused and looked behind me. In the doorway to the ballroom stood a gang of unpurps in business suits.

"Cohen," one said, with a this-time-you've-gone-too-far look on his face, "come with us."

They took me deep into the bowels of New Las Vegas (I love that bilingual train wreck of a name), below factory units, laboratories, and recreations areas; under the purple living spaces, the office clusters, even the subterranean condos, where the unpurps feel safe from cosmic radiation and plan the future of the Mars-that-will-be when the hard-wrought atmosphere, ozone layer, and magnetic field get nanohudued in.

They dumped me in a cavernous conference room and let me wait for what seemed like days, to contemplate my fate. It didn't look good, and I wasn't sure why.

Sure, I was a schlemiel who didn't have proper respect for unpurps, those alta classa snobs who would never dream of taking nanoblock injections that had the

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unfortunate side-effect of turning the skin purple; but I was a good worker. Unlike them, going back to Earth someday wasn't an option for me. No way I could earn enough to buy the ticket home. Besides, I'd burned a few too many bridges in my misspent youth. . . .

The door eventually wheezed open. In strutted a blue-eyed Cuban-Chinese guy dressed in a crackling-fresh corporate three-piece suit and a glowing, strobing powertie. He was also as unpurple as you could get; probably had his ticket back to Earth paid for already. But he didn't impress me much. Not like his companion.

For him, I coughed up some genuine amazement. He hovered over the desk like a manifestation of a god over a sacrificial altar. He was the Nuzoom icon, in all his holographic glory. A 3D cartoon character, he had an oval head, big, "friendly" eyes, a hint of nose, a slash of a mouth, and, of course—his identifying trademark, the pointy speedlines (as in zoom) that are sometime on one side of the head, and sometimes on the other side.

Now and then, for fraction of a second, they would appear on both sides, giving the living logo the aspect of a horned devil.

"Wow," I said. "You got the big guy here to talk to me—this must be important!"

The exec in the strobing tie bowed his head reverentially to the icon, then whispered to me, "Have respect for the living symbol of our corporation."

I looked directly into the icon's eyes, waved and said, "Hiya, Nuzoom, how's it going?"

The exec threw me a horrified glance.

Nuzoom's eyes went through some simple, easy to read changes of expression; then he finally said, "You look at me without fear. You are unconventional. In most cases this would a problem, but for this project, it indicates that you may be right for the assignment."

"Assignment?" I asked the exec.

"Paco Cohen," he said in Standard Corporate English without any trace of an ethnic or regional accent, "I'm William Aute, and I'm pleased to meet you." His handshake was firm, dry and confident. Right out of the how-to-get-rich manuals.

"Uh, yeah," I muttered.

"I—I mean we—caught some tape of that Elvis act of yours. Impressive."

"You looking for a replacement for the robot?"

Aute smiled. His was a strange, cold smile. "In a way, yes."

"You see, Mr. Cohen," Nuzoom flashed a smiley icon at me as he spoke, "morale among the transplanted workers has been a problem."

I laughed, "No shit."

"An interesting idiom," said Nuzoom.

Aute's cold smile faded as if its power had been cut off. Corporate types can be offended by mere words; it always amazes me. "We in management have been giving this a great deal of thought," he said. "We experimented with putting antidepressants in popular beverages, but our medical consultants warned us that could prove disastrous." He whipped out his lapdesk, turned it on, and called up something; then pointed the screen at me. "We've even hired one of the best research consortiums on Earth to look into the problem."

The gaudy logo of Thinktank Carioca danced around the screen, followed by the humble word "presents" rapidly dissolving in and out; then MORALE AMONG MARTIAN TRANSPLANTED WORKERS: IT CAN BE BEAUTIFUL! strobed mercilessly as a synthesized chorus purred "It caaaaaaaan be beauuuuuuutiful!"

Then the spiel text began to scroll:

Mars. Nuzoom's latest acquisition. Humankind's new outpost. A lot of money can be made there. With a lot of hard work, a new paradise can be built. But who will do this hard work? People who are used to hard work, that's who . . .

I groaned and turned away in disgust.

"Is there a problem?" asked Nuzoom.

"Should I kick in the audio?" asked

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Aute. "According to your file, you read English and Spanish."

"Yeah, I can read. It's just that bullshit gives me a headache. What did these hired brains come up with?"

"Bullshit," said Nuzoom. "Interesting."

"I'll call up the conclusion." Aute did some fancy mousestrokes.

And in conclusion, we have found that the transplanted workers of Mars would experience better morale and increased productivity if allowed to take part in activities that provide them a unique cultural identity as well as offering relief from the stresses of their work life. This message filled the screen; the background strobing for emphasis.

My headache got worse.

"In other words," I said, rubbing my temples, "treat us like humans and we might start acting like them."

"Why, yes," said Nuzoom.

"That's good." Aute made a note on his lapdesk. "Your file was right—you are a smart one."

I had a feeling that he was going to say I was a credit to my race. If he did I was going to shatter the screen of his lapdesk on the bridge of his nose. He didn't. I was disappointed.

"In fact," he went on, "we found your file rather confusing. For a transplanted worker you have a high intelligence rating. You even have an interesting, if erratic-education record. Your grades were high when you applied yourself. You could have even made something of yourself, if it wasn't for . . ."

"My attitude problem?" I could see this coming.

"Why, yes. You are an underachiever. An outsider, living between subcultures, always getting into trouble . . ."

"So?" It was the story of my life—heard it all before.

"You are perfect for this project," said Nuzoom, his flickering mouth expanding into a grin.

I shuddered.

Aute smiled. "You studied music, didn't you?"

"For a while."

Nuzoom seemed pleased. "You play guitar. And you've done some composing."

"Some dumb songs and the first movement of a symphony that I eventually threw into the Rio Grande. So this qualifies me to be a substitute for an Elvis robot?"

"Not exactly. We want you to help us create a popular music for the transplanted workers."

I just sat there with my mouth wide open for a while.

To be honest, I was dying for a break from the cleanup squad. So I said yes, put a scrawl and thumbprint on a contract, listened to a lot of fast talk, and even gawked at some audiovisual material off his lapdesk. At first I just smirked, but after a while something ate through the layers of cynicism I had built over the years in order to survive as a Jewish Chicano menchito in a world that yearned for naive dreams of purity. They wanted me to be the first pop music star on Mars, for their own reasons, of course. But it was something like what they used to call the American Dream, that idea all the Hollywoodlands keep hyping to all us poor schmucks who have to do the shitwork. Like when I was young and foolish enough to think that all I had to do was work hard, study hard, do something wonderful and all the nets would take me on, show me singing my songs. And then I'd be on a system-wide link, with frothing females all over Earth, the Moon, the orbitals, and even Mars, crying out for me no matter how long the transmission delay was. The aspiring musician whom I thought I had killed off long ago for his own damn good was stirring and reaching for the controls.

I bought it. All of it. Smiling like a fool.

Soon I was making my way back up to the Purp Zone, near the surface. Hell, we're purp, we don't have to worry about any stray bits of UV or cosmic rays

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finding their way into our altered DNA. I was holding a six-pack of Thark Lite, riding one of the creaking, cramped, no-frills elevators, with a head full of dreams and visions of Coreena's purple-green eyes lighting up when I told her of my big break.

Those eyes were bloodshot and seething with anger when she cracked open the door to her cubicle.

"Where the hell have you been?" she demanded.

"Look, honey," I smiled, holding up the six-pack. "Something wonderful has just happened."

She grabbed a Thark, popped it and started drinking.

I told my tale. Her eyes never lit up.

"So you won't be working on our crew anymore?" she asked.

"Well, no," I said. "I'm going to have to practice, and write songs and stuff."

"And when are you going to have time for me?"

"Hey, we'll find a way. You know I can be pretty ingenious."

She smiled, gritting her teeth so hard it made me wince. "Yeah, yeah, I know. You think you're a damn genius. You think you're so smart. So smart that you're a custodian on Mars. So smart you don't want to be a supervisor. So smart you'll leave me behind while you go off and get unpurpled, maybe even go back to Earth and marry a unpurp woman from a good family."

"You know that getting the nanoblock removed is an expensive and dangerous, Coreena."

"Yeah, but the great Paco Cohen is going to be star! Nuzoom himself actually took a meeting with you. You'll be able to afford anything you want . . . and you won't want me anymore."

I tried to touch her cheek, and nearly lost a fingertip to her snapping teeth. "Coreena, I've told you again and again, we have something special, but it's not as if they'll let us get married. And we lost our ability to have children when we got purped—we all knew that was part of the price we would have to pay. Even if we wanted to do it, our bodies won't accommodate us. Human zygotes can't survive inside a purp womb."

"Purp babies getting uppity and competing for their children's management jobs isn't in their plans, or yours!" she snapped.

I shook my head. "I don't want kids—that why I came to Mars and got purped."

"But don't you see, Paco, this has never been good enough for you. You think you have people fooled, but everything you do gives you away."

Mustering every bit of acting ability I had, I gave her my best hurt-Elvis impression. "What could I do to prove to you that I still want you, baby?"

If possible, her face hardened another fraction. "Would you pay to get us both unpurped, marry me, and be a decent father to our children?"

That was not the response I had hoped for. I dropped all pretense and told her the truth. "The unpurp process is dangerous. It may cause brain and genetic damage. It also may be impossible."

"Impossible? Or maybe it's just that the great Paco Cohen doesn't want it?"

"I don't known, honey, I honestly don't know."

She sneered. "Yeah, *now*, you're stupid like the rest of us, when it's convenient. You make me sick. Get out of here."

I knew better than to be around for her Afro-Irish rages. She grabbed another Thark from the pack, gave me a shove, and almost hit me with the door as she slammed it between us.

I had four Tharks left. I wandered those cramped halls a while. Before the cans even got warm, I was talking to Esther, a short, acne-scarred sweeper who'd been making eyes at me for a while. Soon we were in her cubicle, the beer gone, and we were playing groupie-and-popstar long into the night.

But I didn't get a lot of satisfaction out of it. One thing troubled me. Coreena was one of the smartest people I had ever known. And if this deal bothered

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her that much . . .

I never liked the name Mariachis of Mars. Mariachi music was the sort of schmaltz you heard at weddings and family gatherings. It was nice, but I had something stronger in mind. Aute and the others wouldn't listen to me, and showed me all kinds of research-based figures on why the word "Mariachi" was exactly what we needed. In the end, we settled on Paco Cohen (though there was a bit of a fight over my last name) and the Mariachis of Mars.

Then they looked through their transplanted worker files to get me some mariachis. What they came up with proved that they didn't know mariachi music from rumba, samba, meringue, or rock-and-roll—which would end up working to my advantage.

Since I played guitar and sang, they got me a backup group to fit the spirit of their corporate vision of mariachi music. I was soon dressed in a glitter-spangled mariachi outfit and introducing them on stage at the freshly completed Barsoomian Ballroom (which was a strange thing to name a stadium-style annex to a casino, especially since it didn't have a place to dance).

"On trumpet, that Buenos Aires wildman, Jorge Luis Giaometti!

"On synthobass, the darling of greater Lima, Chonchita Sekizawa!

"And giving us that infectious drumbeat, Pepe Max Jones, from Nueva York!"

The crowd went wild. There we were: me, brown; Jorge Luis, white; Chonchita, yellow; and Pepe Max, black. That is, under the nanoblock purple of our altered skins. Everybody was represented. All the purps were screaming in unison, for once.

When they first came up with nanoblock, some naive idealists thought its most noticeable side-effect would put an end to racism. Unfortunately, we don't all turn the same shade of purple: there are brown-purps, white-purps, yellow-purps, black-purps and various shades in between. Combine that with the fact that we come from diverse cultures, some of which the latest technologies haven't trickled down to yet; and for most of us Corporate English is a second or third language. We spend our new Martian lives slaving, cleaning up messes, trying to build New Las Vegas on the edge of Valles Marineris, and digging in the mines; all while the unpurps wheel, deal, and play indoor golf, and the nanohudu macroviruses chew the oxygen out of, and life into, the landscape. Look at the picture from that perspective, and you begin to get some idea of what the problem was.

We got them all screaming together, even when we finally played a juju version of "The One-Eyed, One-Horned Flying Purple-People Eater." ("It mentions purple people," Aute said, "They'll love it. I've got some focus group stats on-screen here, if you want to look at them.") They kept on screaming. Heads bobbed. Arms reached up and waved. Bodies squirmed.

When our music hit their human nervous systems, the inevitable occurred. The lower parts of their bodies went into action. Butts shifted and bounced in the cushioned seats. Feet tapped to the beat. Like water starting to boil, scattered audience members rose, but did not stand—they danced. It spread like a hyperactive virus through the so-called ballroom. Soon the entire audience was dancing.

It was wonderful.

But not everybody thought so. Suddenly a frantic voice cut into the monitor in my ear:

"What are you doing? Make them stop! This place isn't zoned for dancing! The structure may not be able to take it! Security doesn't know what to do!"

Without missing a beat, I looked into the wings. There was Aute and a gaggle of security officers who had gotten into full riot regalia—just in case. He was screaming into a phone. They looked nervous, scared.

At an appropriate break in the music, I

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screamed, "JUST KEEP DANCING!" The killer, state-of-the-art sound system made my voice explode like a nuclear warhead. Shock waves must have reverberated through the entire system of canyons, as wide as North America.

Aute looked at me with murder in his blue, epicanthic-folded eyes.

It was a thrill, even though it made me a little sick.

Backstage, I had just taken some Tumirite when I heard Coreena's voice:

"You have to let me in! I'm his girlfriend! He's expecting me!"

"You know this?" sneered one of the armored security officers holding her back said, just before catching a knee in the codpiece.

"Yeah," I said, "Let her in."

"*Now* you tell me," the officer squeaked.

She was on me so hard she almost knocked me over.

"I thought you never wanted to see me again," I said, still a bit nauseous about our performance.

"Oh, Paco." She gave me serious smooch. "You know me, I get worked up and out of control, but I wouldn't miss this for the world, this is your big chance! And you were wonderful! And do you ever look sexy in that outfit!"

"Oh yeah." I hated the damn sequins-spangled monkey-suits.

"Could you put the hat on for me?" The look in her eyes made me know it would be worth my while.

I unhooked from her, walked over to the corner where I had tossed it, crashing it like a flying saucer. I picked it up, stuck it on my head, and said, "Here you go—Emiliano Zapata goes to Mars!"

"Oh—" She was getting steamy. "You're beautiful!" Then she attacked me. "You know, you should grow a mustache, like that Zapata guy."

That was when I decided to grow one. She could talk me into just about anything.

* * *

It wasn't actually the sort of mustache Zapata and Villa wore, but more like the ones Marlon Brando and Yul Brynner wore when they played them in Hollywood movies. Zapata and Villa had these corny, upturned handle-bar things that are associated with barbershop quartets. Hollywood decided that droopy, down-turned mustaches were more sinister-looking, better for Mexican banditos—er, revolutionaries. Since then, generations of Hispanic men wore Zapata mustaches, not caring that they were really Brando mustaches.

Oy vey, I really didn't want *any* kind of mustache, but soon Coreena was with me all the time that she wasn't scheduled to be sweeping out offices, giving me lots of free advice:

"You really should go for the bandito look—" she said.

"Revolutionary," I said. "They were revolutionaries."

"OK, OK, revolutionary look. It's sexy. It's exotic. It's light-years away from the drudge-filled lives that most purps lead. It's so glamorous."

"Guerrilla warfare is only glamorous to spectators watching on expensive home entertainment systems."

"Precisely," she gave me her oh-you-just-don't-get-it look, "We don't want to start a guerrilla war here on Mars. We want to give us purps a chance to feel like we can afford to watch revolutions on high-priced systems."

"Ay carumbas!" I was trying to be cute.

"Yes, and you should use more of those Spanish words, maybe start using an accent . . ."

"Ay, ay, ay, ay, ay!" I said, shaking my head, just like my father used to do.

Soon she was answering my phone when she was in my cubicle, talking to Aute about all her bright ideas. Before I knew it, she was off the maintenance detail and working full time as my Image Consultant.

Like I said, she was one of the smartest people I ever knew.

* * *

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It was getting crazy, or loco, as the meshugges were having me say; but what got me through it was playing music again. Even if it was silly arrangements of ancient songs, like that godawful ranchera version of "I Left My Heart in San Francisco." Things were stirring inside me, things that I thought had been killed off a long time ago, back on Earth with the rest of my dreams.

I got the itch to write music again. Soon I was working on some Mariachis of Mars songs that I could play and sing without sneering inside. Coreena and Aute encouraged it:.

"The purps need a voice," he'd say.

"And you can be it, Paco," she'd say.

"And tone it down a little—but not very much," Aute added. "It's just that we really don't want to encourage dancing—the security people think it could lead to crowd control difficulties . . ."

The two of them were always teaming up to talk me into something. The other Mariachis didn't really have a vote. They were just glad to be away from construction or mining or maintenance, to have a chance living in a way that didn't burn them out. I would get some sympathy from them when I'd start bitching.

"I know the stuff they have us doing now is sort dumb, but the people like it," Jorge Luis would say. "But I think you really should try to come up with something new if you can. This is a new world—it needs new music.

"Yeah, man," Conchita would say, "you let them push you around—but remember, they gave us the chance of our lives."

"We really need something to kick ass on this planet," Pepe Max would say, "People who do the work gotta always have music—just don't piss off the unpurps too much."

Soon I didn't care, and I didn't listen to any more advice. Our recordings were being piped all over New Las Vegas, and some of the other, newer colonies on a new interplanetary audio network. We made videos to show on the entertainment net. People would recognize me wherever I'd go—and there'd even be women there for me on those nights when Coreena had too much work to do at the office to answer my calls (which was happening a lot).

For the first time in a long time, I felt like I was somebody and I mattered. I was inspired. Everything was going fine. I felt like I had it all figured out, and was going to win from now on . . .

When I feel like that, I desperately need for my Mama to look me in the eye, and say, "M'hijo, don't be a yutz!" Too bad she was dead and buried on another planet.

One day I was bouncing my brain off the ceiling, trying to come up with a new Martian hit song, and it wasn't coming together. I wasn't living in a Purp Zone cubicle anymore—they had installed me in an underground condo. Coreena popped in and out at regular intervals to keep an eye on me—that day she had honored me with another visit. I paced around the spacious interior, barefoot on the furturf, while she opened her lapdesk and went over the files for my business.

"Do you have to do that!?" she eventually screamed.

"I was thought I was being quiet," I said, without pausing.

"You're grumbling to yourself," she said, "and practically bouncing off the walls like you're going to start tearing the place apart."

"That probably won't be necessary." I meant it ironically, but failed to say it so she'd understand. "It's just that this song everybody wants me to write isn't coming along."

"It's not supposed to just come along—you have to write it!"

She never did understand creativity. I grumbled.

"Maybe you should try working on something else." Her voice was cold, but her eyes burned. "Billy,"—she had taken to calling Aute that—"thinks his idea for a softpunk version of 'The Tumbling Tumbleweeds' will be a hit. Especially with all

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those razorweeds tumbling around."

Razorweeds only superficially looked like tumbleweeds. They were about fifty times bigger, and had a metallic consistency that made them a real menace. A purp in a zip-lock suit could be torn to shreds. Hell, even an unpurp in a beetle suit would be in bad shape.

I stopped pacing and glared at her. She wasn't even looking at me. The damned files were more important to her.

"Everybody hates the razorweeds!" I said.

"But Billy says that footage of them tumbling over the surface could be used to encourage people to come to Mars," she insisted, her eyes still occupied.

"Sounds like it would make a better horror movie to me," I shot right back.

That got her attention. It also got her mad. A lot madder than I expected it would, which was a little odd. "You never like *any* of his ideas!"

"Because they're all pure shlock!"

"You don't think anybody can come up with anything good except you. He's been in marketing for over fifteen years, you know!"

"Oh, of course, the little putz probably has stats on it, right? Purps love being torn to shreds!"

She launched herself at me so fast I could only stand there like an idiot with my mouth open as she slammed into me and pelted me with her small but effective fists. She almost knocked me on my keister, and I couldn't help but wonder how macho my fans would have found me at that moment.

I leaped across the room. Thank God for Mars' puny gravity. As I landed, I knocked over a fancy lamp that fell against the native stone coffee table and shattered into several crumbling chunks.

"Uh," I said, remembering how she had thought the lumpy monstrosity was so classy when she gave it to me.

"Get out!" she shrieked.

"But," I spluttered, "this is my—"

"You think so?" she sneered, a dangerous glint in her eyes. "Would you care to find out who really owns this place, Paco? Shall I place a phone call and show you?"

The day had started out pretty badly to begin with. I decided not to push my luck any further.

"OK," I said, as calmly as I could; and walked out the front door, trying to avoid stepping on the chunks of lamp.

I stomped down the climate-controlled corridors of the spacious subterranean condo sector, feeling bad about being thrown out of my own place. Then I realized that I was barefoot.

For a brief moment I turned around, determined to rush back into *my* place for my shoes; but then I realized that in this sector of New Las Vegas, I didn't really need them. It sure wasn't like the purple sector, where the reddish Martian dust leaked in so fast it looked like there was an explosion in a chili factory. But this place was clean and fancy. No doubt hidden electrostatic dustzappers crackled away in the walls of these buildings that looked too soft to exist on the surface of Earth, much less the radiation-scoured Mars. The ceiling was painted blue to look like a sky, but the illusion was broken here and there by the sky-blue grills of air-conditioning ducts.

I looked hard at them. They did a good job of keeping the climate at seventy degrees. I felt no need for shoes in this controlled environment—the streets were covered in furturf! Those grills certainly were part of an amazing system.

Then I noticed fluffy tendrils of dirty red dust clinging to the grills, fluttering in the breeze from the unseen fans.

I'd been a janitor far too long not to think it: What a big, exhausting chore it must be to keep this artificial paradise clean! I imagined the cleaning crew coming through during hours when the privileged inhabitants wouldn't have to look at them, going over every inch of the upholstered suburb with whirring dustsuckers. The polymetal fabric covering the building was of a texture that was compatible with the velcro pads of special

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work suits. The cleaners would climb to the ceiling like insects.

I was glad that I didn't have to take part in the condo clean-up, but it set off that spark of anger that burned away at me every day I had worked as a janitor.

Suddenly, I felt like someone was watching me.

That was all I needed. Paranoia . . .

The window of one condo had the drapes slightly open. I could see part of a pale face, without a trace of purple in it. A blue eye blinked. The drapes pulled shut.

"Excuse me, sir," a firm voice said.

It was a security officer. Unpurp, in a too-heavy-for-Earth armor rig with bumps that indicated the presence of not-so concealed weapons. One light brown eye glared at me. The other was hidden behind his display eyepiece hanging down from his lightweight helmet. On a place of honor, dead center on the helmet, was a non-animated, 2D Nuzoom.

"Yes?" I decided to be cooperative to the armed, authorized representative of the corporation's division who could easily kick my butt.

The security officer frowned. His naked eye looked me up and down, and didn't seem to like what it saw.

"You're purple—a worker." He stated the obvious.

"Yeah," I said. "You got me. It really does help when I have to go to the upper levels that aren't completely shielded."

He showed no emotion. "You do realize that this is an unpurple sector? Your kind—I mean *workers*, aren't allowed—"

"I have special permission," I said, cutting him off.

His head moved backwards, as if reacting to a physical blow.

"I'm Paco Cohen," I said, "look me up."

His naked eye rolled back into its socket as he looked into his eyepiece. At first he kept frowning. Then his mouth opened in awe.

"Oh." He gave me an artificial smile. "You're part of a special project. I see."

"Yup," I said. "I'm just one special purp."

"Well." He suddenly stopped smiling. "Be careful in this sector. Some of these people aren't used to purps being around. They're important, and not so understanding about some things."

"Really? I thought they were all enlightened and educated."

What showed of his face went blank. "Be careful. We will be watching you."

"Wonderful," I said, and walked away.

I was mad. I wanted out of there. I just wanted to powerwalk like a caged panther until my anger burned off. If that didn't work, maybe I'd just smash something—or someone—to pieces. The problem was, there was nowhere to do that in this underground condoland. Nowhere to go in all of New Las Vegas. Nowhere to go on all of Mars.

I would have loved it if they'd let me have their skimpiest surface suit—the kind that give lots of freedom of movement for working in the mines and construction units—not the bulky, overfed beetle-rigs with heavy shielding to keep their unpurple skins from any nasty gamma rays. I'd walk right into the Valles Marineris and just keep going until I reached Olympus Mons, and froze to death while walking up the biggest pile of dirt in the Solar System. Yeah, that'd be something. Eventually, the scout teams in their radiation-proof beetle suits would find me and wonder what the hell I was doing walking up such a high mountain.

Maybe to make it seem more mysterious, I should write something in the snow. Something like "Kilimanjaro." Or "Rosebud." Or "Coreena, Coreena!"

But, there was just no place to go.

I turned back, headed for my condo. Coreena was probably still there. We could have a nasty fight, then some nasty loving, then a good night's sleep . . .

Something was wrong. The door to my condo was unlocked. This wouldn't have been such a big, hairy deal, because un-

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purps who live in condoland are so used to security being a given that they *never* bother locking doors. But, I grew up in that West Texas Juarez ghetto. I lock doors, watch my back, and maintain a safe perimeter at all times—*and* I distinctly remembered locking that sucker when I stormed out of there.

It was part of the pleasure of this wigout.

I scanned around for something I could use for a weapon. This being a secure sector, there was nothing. And I didn't even have anything in my pockets. Hell, I was barefoot—I couldn't even make a shoe and a sock into an impromptu face-smasher.

Cursing my stupidity, I took my shirt off and tied it in a knot, to save the wear and tear on my fist in case I had to punch anybody. Easing the door open, so it didn't make any noise, I slipped in, looked around, checked behind the door and in all the corners. And saw nothing.

But I did hear something.

Someone was moaning. It was coming from the bedroom. Clenching my knotted shirt tighter in my fist, I stealthily made my way to the open door and looked in.

At first, the sight of Coreena and Aute doing the horizontal hula shocked me. I raised my shirt-covered fist, and it shook. Then I let go.

I really should have seen this coming. Coreena had been acting funny, spending a lot of time with Aute. The last few months had turned me into a flaky artfart who threw hissy-fits and didn't get any work done. And she was the smartest person I had ever met. She would always know which was the best way to jump when the shit hit the fan . . .

And I had long since given in to the lure of the groupie effect. Hell, she and Aute had encouraged it. "This will create the legend. These women will talk. More will want to be part of it. It'll be a marketing bonanza!"

Yeah, so I slipped out of the condo, back onto the climate-controlled, carpeted streets, untied my shirt from around my fist, put it back on my torso, and walked away, humming to myself.

An unpurp woman—a NeoMartian equivalent of a shiksa—was suddenly in my way.

"Say," she said, looking me up, down, in and out, "didn't I see you on the newsnet?"

"Could be. They keep pointing cameras at me."

She laughed, put a red-brown hand on my purple arm. "You're that sexy Paco Cohen who does that mariachi stuff, aren't you?"

It was stronger and faster than the groupie effect.

I thought about her and me, Coreena and Aute. Purple and unpurp. And before the artificial lights were warming the fake blue sky with "morning," I had the first Martian blues song playing in my head.

Of course, Coreena, Aute, and Nuzoom weren't too crazy about it.

"I don't think this piece is what we had in mind for our Mariachi of Mars vision," said Aute.

"Vision?" I pondered. "What vision?"

"You know," Coreena said, "our scenario for providing positive role models for leisure time activities."

"Oh yeah." I really tried not to smirk.

"We would like to have songs about workers enjoying the good life here on Mars," Aute went on, "no—eh—'Purp/Unpurp Blues!'"

"Working folks like blues." I tried to explain. "They live blues! Hell, Coreena, we were them a few weeks ago! Don't you remember?"

She gave me dirty look, glanced at a printout of the lyrics, put a finger on a line, then read:

"Your skin, my skin, purp and un
come on baby, gimme your fun
don't care if your man, runs to get his gun. . . . ?"

She looked at me, through me. My blood practically sizzled around my bones.

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I glared back at her, then did the same to him.

"Sounds like life itself to me," I said, with a grin that should have revealed fecal particles between my teeth.

Her nostrils flared. He blushed.

"You bastard," she hissed.

"Uh—" He interrupted her. He seemed determined to pretend not to know what I meant. "It's just that you're suggesting something that isn't considered proper to be mentioned in a—er—public forum."

"I thought we were talking about music." I said, my expression innocent.

"Oh—we are." He stumbled along. "But this is music commissioned to serve our society."

"Yeah," I said, "somebody can pay to get the ball rolling, but nobody knows where that ball is going to go once it starts bouncing around. If you do it right, your creation takes on a life of its own, grows a *mind* of its own. It goes off and does what it wants, what it *has* to do. All your grandiose plans and pretensions are ultimately shattered. And if you try to impose your will on your creation, it simply kills you and goes on without you. . . like Frankenstein's monster. It's the same with Paco Cohen and the Mariachis of Mars, and with the barely stirring, newfangled biosphere of Mars."

He was puzzled. Coreena looked as if she wanted to kill me.

"Uh-huh, yes." Aute struggled to regain control. "But there's no reason we can't come to some kind of compromise about this. We can salvage the tune. Perhaps some trimming . . ."

"This is a bare bones blues," I said, "There's no fat to trim."

Aute frowned, then forced his face into an emotionless mask. "Look, Paco, we've given you a lot of slack. First, with that dancing business—the security people are still pretty unhappy about that. Purps are even being caught dancing on the job! That's outrageous!"

"Yeah," I said. "They were probably feeling good. Can't have that."

Aute's frown won the battle with his face.

"Paco!" Coreena leaped in. "Don't you realize this isn't just about having fun! It's a Nuzoom project! The corporation has an agenda!"

"Of course. I have an agenda, you have an agenda, Mars has an agenda. But you know what? Music has an agenda, too! Art had its own agenda! It's gonna do what it's gonna do. You, me, Nuzoom won't be able to alter that."

"Total nonsense," said Aute.

"It like the nanohuduing of Mars," I tried to explain. "The engineers busted their brains trying to get it to create a prefabricated ecosystem with everything in place, in perfect balance and harmony and all that crap, but guess what? Life has to adapt to reality. Instead of NeoMartian friendly trees and vegetables, you get razorweeds!"

"So we should just give up and scare people away from Mars?" Coreena was disgusted.

"No." I took a deep breath. "I say we just keep partying. People will see what fun's being had, and they'll want to join in. Soon we'll all be boogieing with the razorweeds! Hey! That's an idea! 'Razorweed Boogie!'"

"I'm getting sick of your attitude," Aute said.

He was about the turn around and walk away.

Suddenly, before I even thought about it, my fist smashed his cute little nose.

"You bastard!" Coreena screamed.

Aute made a sound like wounded kitten. He sagged into his chair. Blood streamed out of his broken nose, onto his suit and tie.

I knew this was probably my big mistake, and I was in big trouble even though nobody was going to say anything. At least, not right now. With a big smile on my face, I turned my back on them and walked away.

For a wonderful, short span of time, I felt great.

Yes, it was all so wonderful for a while.

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I was on top of the world. Or at least Mars.

Coreena and Aute backed off my case. For once I could do what I want. "Razorweed Boogie" was a masterpiece.

"Razorweed, razorweed,
tear the Martian dust
tear up the death, stir up the lust
Razorweed, razorweed,
make the planet scream
'cause dry ol' Mars
needs a new dream."

It was all to a twirling, slashing, driving beat that caused funky things happen in the regions under the belly-button. The band loved it, because it let them show what they could do. The fans loved it, because it moved them, and made their lives feel good.

And I was feeling good. Too good. I should have known.

But I was too busy. Songs kept coming to life in my brain. I wrote them one after another, they just squirted out of me, "Nanuhudu Me Tonight," "Mars Grav Dancing," "Dream of Being Back on Earth (A Nightmare)," "Sweating Purple," "NeoMartian Mama Mambo," and a few others that don't quite stick in my memory. Nuzoom Entertainment had us recording and giving concerts (where some dancing was allowed, with security watching carefully, ready to stomp out any trouble).

I couldn't keep up with the all the women the groupie effect was sending my way. They were purp, and unpurp, all shapes and sizes. Nearly wore me out. I was buying a lot of smart condoms, and checking their readings carefully.

It was when I was with one of these liveries, a wild little Euro-Yoruban purp, that all their diabolical plans made themselves clear to me. She had me masterfully distracted. I was flailing in an ecstasy that occupied all my senses when a searing pin-point bit into my skin, my nervous system, my brain, my ever-loving mestizo soul. I was looking right into her eyes. She pulled the stinger out of me and smiled, sheepishly.

Suddenly, light flooded in from a burst-open door. My hot Euro-Yoruban slid out from under me and hid herself behind a pillow and a wad of tangled sheets. I could barely twist my head enough to see dark shapes in the doorway. Then electric arcs leapt across the room and short-circuited my nervous system.

They just kept at me for a while. I thrashed around like an epileptic in the mother of all grand mal seizures. Then the white hot sparks got into my brain, and everything went dark, and wet, and sticky . . .

Someone turned on a light, but I wasn't ready for it. It hurt like hell; not just in my bloodshot eyes, but all over my skin. Being brutalized made me ridiculously sensitive.

I was in a crisp, clean bed that smelled of chemical death to all microbes. Machines violated the sanctity of my body, tubes draining and sucking, wires reading and zapping. Gowned and masked figures—couldn't tell if they were purp or unpurp—scurried about, paying closer attention to the machines than me.

Then they all turned and bowed their hooded heads in respect.

And there it—*be* was, Nuzoom, the living logo. He was so bright that he burned a series of afterimages all over my aching retinas. The speed lines flashed so fast from one side of his head to the other, they seemed to be in both places at once, making him look more like a devil than ever. I could tell that he didn't care he made my eyes hurt.

"You are lucky," he said, his mouth-line giving no indication of emotional resonance.

"Oh yeah," I said, not sounding like me, "having the time of my life."

The mouth-line curled into a smile. "Yes. And the time of your life is now officially over."

"Nuzoom giveth, and Nuzoom taketh away."

He flickered and paused. "A religious reference. You recognize my god-status."

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I tried to laugh, but it came out like a wheeze. "That stuff is all just in people's heads."

Eye-dots became slits. "Yes. You have a dangerous mind. It has been useful, but now it is counterproductive."

"You gonna kill me?"

Eye-dots became round again. "No. That would be barbaric. We have devised a different, civilized solution. You will no longer look or sound like Paco Cohen. We will report that he died in a tragic accident. He will be bigger in death than you were in life."

"Lovely. So what about me?"

The cartoon face took on the aspect of a skull for a moment, like the Lord of Xibalba, the Mayan Underworld. Or like the Sheea, the Avenging Angel of the Jews. Or the bastard son of both. "You are once again what you were. An unskilled purp worker. You will go back to work. On the outside."

Unpurps are scared to death of the outside. For several moments, I struggled not to smirk. And then a mechanical arm unwound from the bed and hovered over me, sprouting an array of shiny, sharp tools, and all the fun went out of the situation.

"Now," said Nuzoom. "We have some changes to make."

I was shackled to the bed. I couldn't do more than twitch. And scream, since they didn't bother to use an anesthetic. That's when my voice changed. Vocal cords can only stand so much strain.

But hey, ya gotta pay your dues to sing the blues.

Afterward, they wrapped me in work coveralls and a zip-lock, and a couple of bug-suited unpurps sneaked me out. The Sun was rising over the Valles Marineris. The new light poured into the big canyon. Pretty colors were everywhere as they jerked me about, ripped open my zip-lock, and shoved me into some vampire cactus. I hung there like a second-rate Jesus and watched the bug-suited Romans stomp out of sight through the dusty dawn.

But I wasn't another Jewish martyr hung out to dry. Jewish lineage is passed through the mother. Mine was a good Mexican girl, Catholic to the bone, except in her choice of a husband. She might not have been happy to see me in that position, but her friends would probably have been jealous.

A sucked-dry glabbit, its big wing-ears shriveled like autumn leaves, hung near my feet. Above my head, on the cactus' crown of flowers, were several impaled pterobats, wings and ears still twitching, toothy-beaks snapping feebly. Blood would begin to drip, be drawn back. Their blood, my blood. It didn't matter. Such is the NeoMartian world that nanohudu has wrought here on Mars.

I could have died. Perhaps Nuzoom was willing to risk that, but this little drama had been worked out to the last detail. It wasn't long before a work crew was trucked out. They were armed with flamethrowers to keep the vampire cacti from encroaching on New Las Vegas' perimeter. They found me, peeled me off the bloodsucking plant, and turned me in to Lost and Found.

So as far as Mars and the rest of the system was concerned, I was dead; just as dead as the Hunapu brothers, the hero twins of the Mayan Sacred book, the *Popol Vuh*, the first time the lord of Xibalba defeated them.

But I won't compare myself to Moses. I'd hate to get struck by a lightning bolt.

The system gulped me down and reprocessed me. I was advised not to remember my past. Besides, who would believe an ugly wreck like me was ever that handsome devil Paco Cohen? I was given a new name. Doroteo Arango. They let me pick it myself. It was the real name of another guy from my old neighborhood. He got to be pretty famous with his new name. Not many people realize that Pancho Villa was a pseudonym.

Soon I was just plain 'Teo. Another guy schlepping around, picking up trash,

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sucking up dust, and breaking out the implements of destruction to keep the new-fangled flora and fauna from destroying the settlement.

I was way, way down for a while. Who wouldn't be? I was back to doing shit-work after riding as high as a purple-assed bozo could on Mars. Work was agony. In my time off, I'd mope like a zombie and drink—at first Thark Bold ('cause like they say in the commercials, Lite don't always cut it), then harder stuff—home-brew from clandestine stills, made with stolen and hoarded foodstuffs and even bits of NeoMartian plant matter picked up on the outside. Who'd have thought that the fruit of the vampire cactus would make such great booze?

But of course, the really good stuff, that went down smooth and sweet and tricked my body, brain and soul into believing that I wasn't the biggest loser in the solar system, put a smile on my face and made my feet tap, made me get up and dance to whatever music was passing through the stale, climate-controlled-to-death air, couldn't be bought in the company refreshment shack in auto-cooled six-packs that you could take back to your tiny cubicle to drown your troubles. The good stuff, the home-brewed miracle juice, didn't travel or keep well. It was like pulque—the sacred Aztec drink—you had to drink it just after it was made. The gods wouldn't have it any other way. And something told me that the gods of Mars made those of the Aztecs seem like a gang of spayed and neutered antiviolents.

So I spent more and more time in the cramped, little (often literally) hole-in-the-wall joints that were springing up all over the Purp Zone. Few of them were licensed. Kids were paid to stand lookout in case an armored security crew felt like coming in and busting a few heads, "just to make an example."

It wasn't a bad life, even if they kept playing holograms of "Paco Cohen," playing with the surviving Mariachis of Mars. After a while I began to feel good. Sometimes I even got up and danced.

It was dancing that really brought me back to life. Especially after I danced with a gorgeous creature named Jamuna. That was when I knew I was going to be all right.

She was a small package of womanhood that some might have said had too much meat on the bone, but her curves were in all the right places, and when she danced—the way she moved made her the most beautiful thing in this crazy Universe! She became the music. The sound made flesh. My mouth watered. I wanted to dance with her until the Universe collapsed. I wanted to play her like my guitar, sing her like a song, and compose her marvelous movements.

I was actually shy at first. Hell, I wasn't a good-looking corporation-backed superstar anymore. My face was badly mangled, and the rest of me was covered with nasty scars. Could the fabulous Jamuna possibly want to dance with me?

I mulled over it for several nights. People heard me grumbling about it; they told me to just go ahead and do it. Then one night Jamuna showed up in a skin-tight dress that I later learned she had made herself. My poor intellect was left behind while my instincts took over. Goodbye brain, hello feet. Move it, baby.

And it was good.

Not just me. Not just her, but me-and-her. The two of us. Together, we had something, *were* something.

Or as she said, "Teo, mani, ya got da music in ya, so ya gotta let it out."

Yeah, I let it out. Like the nanohudu letting the savage, beautiful potential for life out of long dead Mars. Like the way Jamuna's smile could make me feel like a real, live human being.

Suddenly, I had a life again! The days of scrubbing, dustsucking, trashpicking, sweeping, and mopping seemed to fly by. The nights of music, dancing, and hot, bubbling love seemed to go on forever—a strange kind of forever that didn't last long enough.

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But there was more going on. Besides the party animal hiding deep inside me, Jamuna had awakened the social animal. Before I realized it, we had friends, a regular extended family—and I'm not going to mention any names, because I love these people and don't want Nuzoom hurting them to get at me. And, miracle or miracles, I found myself with a new band.

Teo el Neo and the Flying Serpents (named after the feathered rattlesnake/cobras that have been sighted flying through the freshly-wrought atmosphere of Valles Marineris) is the hottest thing around the Purple Zone. Mostly live gigs, but the equipment for outlaw, non-corporate recordings is around. More often than not these days, as the purps toil away, when it's not the holographic Paco Cohen and the Mariachis of Mars, it's my new identity, and new band's music that's blasting away.

And that's not all. More and more purps are making their own music. They take bits and pieces remembered from the places on Earth they escaped from, take what instruments they can find, sometimes even inventing new ones, and they do variations on variations that weave into their lives. This is music that people work, unwind, fall in love, and die to. The new folk art of Mars is here, and it's damn glorious!

It's like in the *Popol Vuh*. The Hunapu Bros, the hero twins, defeat the rulers of Xilbalba, the lords of death, "only through wonders, only through self-transformation."

See, Nuzoom? That's the way it works. Try to make me into shit and flush me, and I keep on transforming myself, and keep coming at you.

I've often wondered what would happen if word got out that Teo el Neo is really the new, improved Paco Cohen? Would people think it's kosher? Would the scandal shake the solar system? Or would people's natural curiosity and access to information eventually lead them to the truth?

I suppose they could always try to kill off the new me, but I don't think they will. Nuzoom probably doesn't even want to think about having still another god on his hands. But dead or alive, I'll just keep on transforming . . .

It should be interesting, but I don't worry about it now. I have a life, it's wonderful, and I can't wait to get back to it.

I also can't wait to get back to my symphony, the one I threw away centuries ago on another world. I've managed to reconstruct it. It's coming along nicely. Someday it'll echo over New Las Vegas, down Valles Marineris, up Olympus Mons, and beyond. It'll make *everybody* get up and dance. Think I'll call it Neo-Martian Symphony Numero Uno.

The only thing I'm not sure of is what name I'll sign to it. I'm not sure who I'll be by then. The one thing I'm sure of, from now on my transformations will all be my own, and there's more than enough wonder to go around on Mars.

I saw Coreena on the news the other day. She's really climbing that corporate ladder. Just about all the purple has leeched out of that skin of hers. I wonder if she'll eventually consider it to be mistake.

After all, his world belongs to us, not the unpurps. It's in our blood, our cells; it's in the hopped-up juice we've been distilling from the nanohuduized fruit of the vampire cactus. Blood calls to blood, life goes on in its own pattern, no matter what those pale earthlings want to think. How do I know this? It's not just the booze talking. It's not just the music frying my brain.

It's Jamuna. She's pregnant. And she's not the only one. The zygotes we make aren't human anymore, they thrive. A crop of purple Martian babies are due in the spring. Of course, our spring is six months long . . .

Tigotes, razorweeds, dragon mosquitoes—and me. The NeoMartians are here.

And that's just the first movement of the symphony. Wait 'till you see the second. ■

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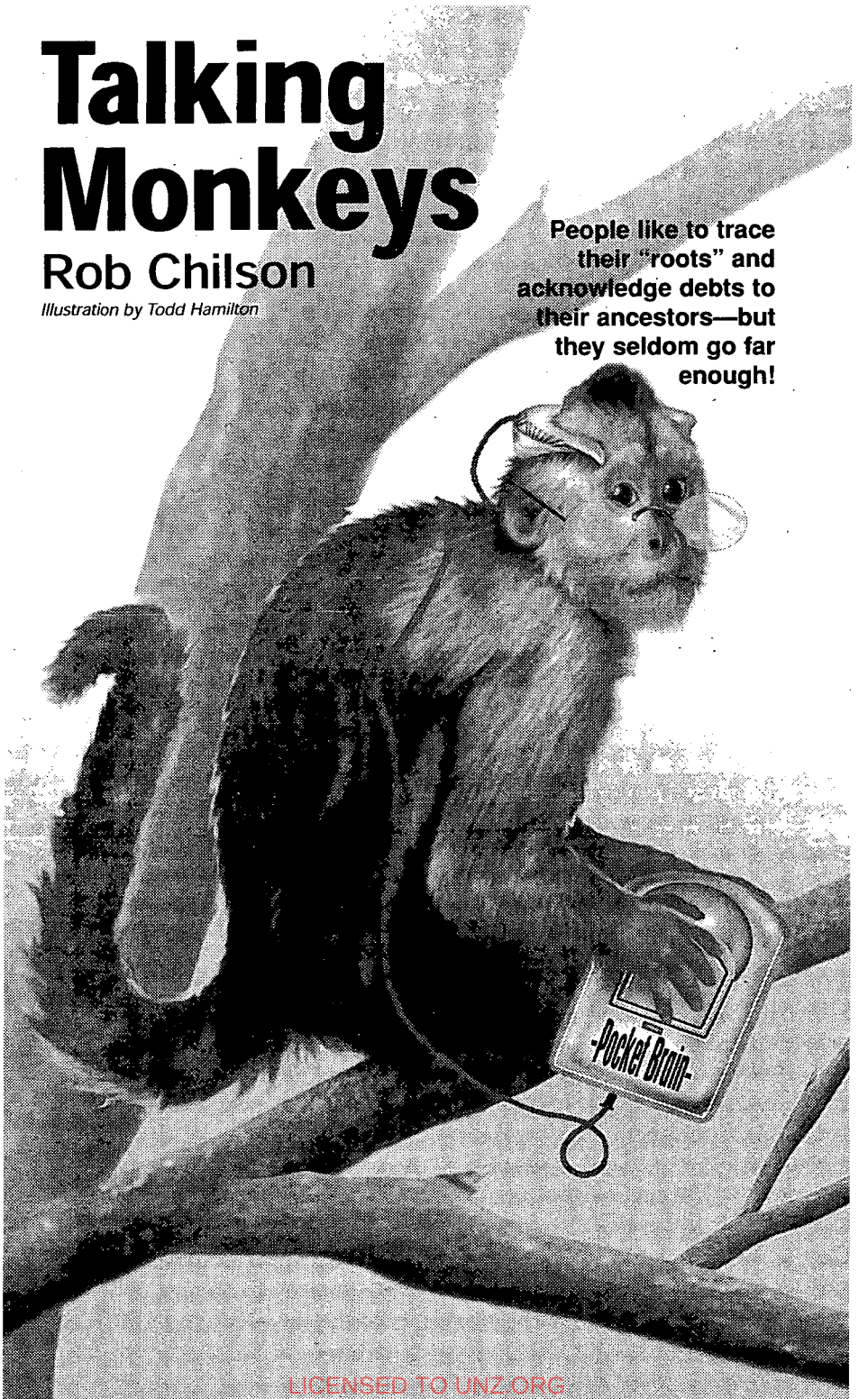
Talking Monkeys

Rob Chilson

Illustration by Todd Hamilton

People like to trace their "roots" and acknowledge debts to their ancestors—but they seldom go far enough!



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When I first met Carmilla Prentiss, she was wearing a pair of beach sandals and a vague expression. "Are you the Director?" she asked.

I was wearing boots with mesh over the drain holes, fiberglass denim pants and shirt, leather gloves, and about half the Spritely Sea.

"Yeah," I grunted from my position, bent double, and took a deep breath.

A wave washed over me, but I was well-braced and didn't lose my grip on the aggcoral. When the wave went away, I heaved. The aggcoral broke with a snap and I splashed out of the water just ahead of the next wave.

"Oh, is it diamonds?" she asked, her expression much sharper.

"This?" I asked, hefting the aggcoral. About half a kilo. "Maybe eleven or twelve percent of the pebbles are diamond," I said.

She came up close and peered at the lump with interest, though it wasn't much to look at—an agglomeration of sand and rock from the seabottom, glued together into a shape about that of a hollow yam, but not so regular. Its stinger-tipped arms flailed the air. "Coral" of course is a misnomer, though it does form reefs.

She was standing close enough to me to touch, and though her expression of intense concentration on the aggcoral did not invite being touched, neither did it discourage it. I frowned, studying her while she studied it. Her face, figure, and hair were merely good, in an age when superb faces, figures, and hair were affordable even for poor folks: a natural beauty.

"How about the beach?" she asked, looking up at me. She made no move to retreat, even after I lowered the aggcoral. "How much of it's diamond?"

"Depends on whether you're looking at the part swept by waves or the part farther up," I said. It was gravel and rocks, but she apparently didn't have the term *shingle* at the tip of her tongue, and she visibly wasn't wearing her pocket brain. "Down here, say eight percent; up to twice that farther up among the weeds. The waves kick diamonds farther because they're lighter than pebbles."

She continued to stand well inside my personal space, clearly more at ease with her nudity than I was, and frowned around at the shore. The trouble with being naturally good-looking is that you can learn young to trade on it.

She looked back up at me, pouting. "None of them *look* like diamonds."

I had now been waiting several minutes for her to introduce herself. "Rough diamonds just look like pebbles. If you want to see gems that look like gems, you'll have to look for, say, emeralds."

That visibly lit up her mind. "Are there emeralds here *too?*"

"No more than on any Earth-type planet," I said. "Beryllium is rare everywhere."

She frowned, apparently not understanding the connection between beryllium and emeralds. Better not to tell her that most natural diamonds are yellow or brown.

Tired of waiting, I took off my glove and stuck out my hand. "I'm Dr. Henry Rufford, Director of the Behanan Scientific Expedition."

At that she woke up and took my hand, still standing too close to me. "Carmilla Prentiss. I'm a Statistical Analyst."

I nodded; we'd ordered one. "Come on back to the station and we'll get you logged in."

By God, she absolutely grabbed my arm as she trotted to keep up with me. It was confirmation I didn't really need that Carmilla Prentiss was going to be trouble.

On the way back I queried Planetweb through my pocket brain, and learned that an unscheduled ship had come in while I'd been at the shore—I'd had my "do not disturb sign" out. Carmilla and three others, and some junketers, had

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come in on this ship. I hadn't been expecting them till the rotation flight, next week.

Neither had my ExecSec, Wen Ping-Ping. She was out on a "picnic" on the Barrier Islands that was to have begun with the placing of observational buoys and end with seafood cooked on driftwood on the beach. I didn't expect her back before tomorrow.

To her credit, Carmilla paused to don a light dress, picking it up where she'd evidently dropped it, on the beach inside the bay. Presumably she'd asked the swimmers here how to find me. This was in plain view of the little village we called HQ Station.

HQ—Alpha Continent Station Nine—was a collection of graceless but functional white prefab buildings, bright in the subtropical sun, shaded here and there by slender native trees. Footless four-winged aerials gave life to the scene, flapping sinuously about.

There was a community hall, an administration block, a machine shop, barns and corrals, and five big lab buildings, surrounded by nearly a hundred dwellings. With a population of over three hundred, AS9 was the largest community on Behanan's World.

In my office in Admin, I put the aggcoral into my small aquarium, took off my scratchy shirt, kicked off my boots, and removed my wet collar.

As it came away from my skin, the neuro-antenna threaded through the knit material pulled away from my nerves. In that moment, the faint murmur of the communications web of Behanan's World fell silent. Also, I lost two-thirds of my memory, ninety-nine percent of my computational ability, and much of what made me uniquely *me*.

I stood mazed and stupid, a shorn and powerless god—blind, deaf, dumb.

Well, when you wear your pocket brain during every waking hour, you tend to map much of your personality onto it.

I quickly dried my neck and found a dry collar in my desk. I took my pocket brain out of the wet collar, tucked it into the pocket in the dry one, and plugged the neuro-antenna into it. Then with a carefully hidden surge of relief, I wrapped the collar around my neck and was whole again.

How the hell could Carmilla stand to run around naked?

Through my pocket brain, I opened the Personnel page in Planetweb, and said, "OK, what's your Unident?"

"Uh—I don't know," she said, and must have read my expression.

Not to know your Universal Identification number is the depth of stupidity—it's a simple nine-digit number with a three-character alpha prefix. And Carmilla was a Statistical Analyst!

"Shall I go and get my PB?" she asked apologetically, and looked around with visible relief at the man who entered, smiling at us.

"Johnny Simmen, Carmilla Prentiss," I said.

"Johnny Card to my friends," he said instantly, pumping her hand with comic enthusiasm. "And I haven't got any enemies."

"Really?" she asked, smiling up at him.

Johnny is tall, broad-shouldered, and genial; and his good looks are as natural as Carmilla's.

"Nary a one!" he insisted. "Which creates a mystery." He frowned portentously. "*Who* has been shooting at me?"

Carmilla recognized this as a joke and smiled more widely. "Not enemies?"

"Impossible! If they were enemies, would they have missed? No, no, they must be friends."

I cleared my throat. "Carmilla doesn't remember her Unident, and isn't wearing her pocket brain. Perhaps you could log her in."

Johnny was assistant to Jenna Kristapovich, my Executive Director.

"No problem, and no PB needed," he said, and glanced at the viewplate of my terminal. In a moment he had called up the passenger list of the *City of Auck-*

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land, the non-sched. And sure enough, there was her Unident. He then called up the Personnel forms and swiftly and deftly transferred her data.

As he worked, Johnny said, "Jenna wanted to tell you that she'll be back to Alpha Continent tomorrow." She'd flown to Gamma to look into a grievance, and hadn't been able to message me because my pocket brain was signaling "do not disturb". To Carmilla he said, "Ruffles here will put you to work. See you later!"

To her visible disappointment, he waved and strode jauntily out, clearly not giving her a second thought.

"You just got in. You need to go through Orientation. We can schedule that this afternoon," I said to her. "And you can spend a few hours settling in. Don't go swimming except in the bay—you could get all scratched up and even stung, but there's no coral in the bay." It was killed by the fresh water of Alpha-Nine River.

Carmilla nodded vaguely, and glanced around with more interest as two men entered my office. No one knocks on my door—if it's open, they come in; if it's closed, they go away—nobody has time to wait.

One was a big, burly, hulking fellow; the other was medium height, slender and wiry. Alan Paukstelis, Department Head of Biochemistry, and Larry Arkenberg, the head of our maintenance section.

Larry, the laborer, was the small guy. He stepped forward and laid a cloth-wrapped bundle on my desk. "Before you professors get talking, you'd better take a look at this." He unwrapped the oily cloth with oily hands.

"What is it?" I said, bending forward. Then my eyes widened.

"Nothin' now," he said darkly. "But it used to be the wheel bearing from a Scrambler."

Even an evolutionary biologist like me can recognize a roller-bearing race. Besides, when I was a kid I was into street-racing ground-cars for a couple of years.

"Diamond dust?" I asked, with foreboding.

"Right the first time," Larry said with gloomy satisfaction. "Chewed to hell and froze up solid."

"Damn," I said faintly.

Like Carmilla Prentiss, most people are taken by the idea of a planet where a sizeable fraction of the primordial carbon was squeezed to diamond in the interior, then brought to the surface by subsequent asteroid bombardments. As an evolutionary biologist, I was indifferent to diamonds. From the viewpoint of biology, they were insignificant.

They were also economically insignificant. A spacefaring age can manufacture diamonds more cheaply than it can dig them. Even on Earth before the space age, diamonds were so common that the price was maintained by a monopoly.

But they still have an emotional impact on our monkey species. The "Carmilla effect" had been the only one they'd had. Until now.

"I thought bearings are sealed against dust?" I asked, trying to keep the irritation out of my voice.

"Oh, yeah, they are," said Larry disgustedly. He was foreseeing the same problems I was. "They're sealed against ordinary dust. Anything small enough to get in didn't matter much—till we came here." He glanced at Carmilla.

She had drifted close to the men and was looking as if in fascination at the bearing. Homo-tropism, I thought. It was suddenly obvious that Carmilla was wearing nothing beneath her dress.

Obvious to all except Dr. Paukstelis. Alan was communing with his pocket brain, wearing the same absent-minded expression that scientists have worn since Aristotle's day.

"I'll make an announcement," I said. "All personnel to be warned of potential Scrambler bearing failure, and to be alert for noises and handling problems. All bearings to be pulled and cleaned."

"Order a couple of thousand spares,

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while you're at it—all our Scramblers take the same model."

"A couple of thousand?" I cried.

Larry shook his head. "I'll try to figure some way of double-sealing them—duct tape or foam spray, maybe. But if I can't seal 'em, no amount of cleaning is gonna save the bearings. And I haven't even started looking at the steering gear yet. It looks like we can't rely on Scramblers too much."

"Damn," I said again, with feeling.

"That's not all," Larry added. "Anything with moving parts is at risk." He pointed at the swing-arm lamp on my desk. "Your lamp probably won't seize up, but any scientific instrument that has moving parts, especially parts that move a lot, or very fast—" He made a ripping sound and ran a finger across his throat.

"Double damn! All our robots too!" We had not brought "walkers" with legs—we'd known their joints would have been at risk—but our wheeled robots, from working robots to the Observers that mingled with the mighty herds of herbivores on the prairies and steppes of Beta . . . .

"Yeah." Larry grinned at me, not without sympathy, and back at Carmilla. He could afford to be cheerful—he'd just met a new kitten.

They went out together, he explaining to her just how much trouble he'd brought me. Orientation, I thought sardonically.

Alan was still in his own world, so I directed a thought at Planetweb, making a note in the operational sector about the problem and the announcement I needed to broadcast. I flagged it for both Wen Ping-Ping and Jenna Kristapovich, my ExecSec and ExecDir, rating it "Double-Urgent".

When I looked up from this moment of concentration, Dr. Paukstelis was watching me patiently. He had finally become aware that we were alone together at last.

"Yes, Alan?"

"I hear a Statistical Analyst just came in on that non-sched—the *City of Auckland*," he said instantly. "Good! I thought we'd have to wait till the next rotational ship. I want to get him started right away on the DNA breakdown—"

I was holding my hand up. "You just missed her—she went off with Larry Arkenberg. And if I'm any judge, he's showing her every tool in his shop about now."

Alan looked startled. "Is he that deprived?"

I laughed. "Deprived or depraved? In this case I blame the woman. Don't let her get you alone, not where word might get back to Lisette."

"Oh, she's broad-minded about minor flirtations," he said seriously.

"Well, you've been warned," I said, and sighed. "That woman is going to be trouble."

"Anyway, as soon as she's available, I want to have her start work on DNA." He looked suspiciously at me. "I hope you don't think there's anything of higher priority than resolving the DNA question?"

Innocently I said, "Why, I thought the evolution and radiation of the siphon worms was of *far* greater importance—" But his pouting expression broke me up. "Right, I'll send her a message. I wouldn't expect her to start work till tomorrow morning—she's just landed on a new planet, you know."

He went out, shaking his head at some people's priorities.

When he had gone, I glanced into my aquarium at the aggcoral, and sighed. Science is the fun part—it's why I live—but I was director of this expedition. Though I had both an efficient executive secretary and an executive director who were expressly provided to deal with routine business, there were some things I had to do myself.

Now Behanan's World itself was throwing problems at us.

For traffic between stations we had a number of big airtrucks—eight to ten stations on each of four continents. For

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local transport we used Scramblers. They're much like the groundtrucks you see on any planet, boxy things with fusors and electric motors in the wheels.

Now it looked as if local research would soon be restricted to shank's mare. A lot of scientists were going to start howling when that happened.

The Behanan Scientific Expedition had 5,562 members. Also on Behanan's World were 132 nearly-grown children and a varying number of political and professional junketers, journalists, and less-classifiable hominids. The arrival of the *City of Auckland* and the needs of all those people kept me too busy to get any work done for a couple of days.

The aggcoral I'd plucked had cemented itself to one of the flat rocks on the bottom of the aquarium. I dropped corn meal and grits into the tank twice a day, and checked to be sure it was pumping water in one end and out the other. After a final press conference—at which I explained again that even the new "robust" nanobots were too delicate for investigating native life forms, whose defenses we had not yet begun to understand—I watched the *City of Auks* take off, sighing in relief.

Back in my office, I took the aggcoral out of the tank. It flailed frantically with its stingers, but couldn't get through my leather gloves.

Putting it on a bench, I hit it sharply a couple of times with a hammer, then more sharply a couple of times, and felt the aggcoral break. Tougher than it looked. A little fine work with the hammer and pliers, and I had it out of its shell.

The aggcoral animalcule even looked like a sweet potato, or yam, only paler. It was striped in colors ranging from pale yellow to a light yellowish-brown, and the stripes ran from mouth to anus—just as Dani Potkin had described. The "skin" of the animalcule, the "agcoran" she called it, was smooth and not visibly porous, but I noticed it never quite got dry. Peering into the mouth, I dimly glimpsed greater complexity – but it was distressed.

It couldn't flop around—all it could do was pulse, but its pulses were becoming feebler and its arms hung limply. I quickly held it up to the video recorder, turning it every which way, then lowered it into the water again. I waited until its pulses became strong and regular—and it almost got away from me.

I got both hands on it, stuck two fingers down its throat, and tore it apart. So far, I was merely duplicating Dani's brutal original experiment. She'd wanted to find out to what extent agcorans were able to regrow when torn up, as lower lifeforms on many planets can do. She already knew that it had no nervous system.

Each stripe tore free from its neighbors as readily as Velcro™ fasteners. Released into the water, each fluttered down like a lifeless ribbon, exuding a cloudy white liquid. I watched for a few minutes, during which they did nothing.

Half an hour later, when I looked, the stripes had rolled up into coils. An hour later, one of these had elongated into a straw, was already hollow, and had started to pump. Turning back into one of the aquatic worms Dr. Potkin called "siphons". I dropped corn meal in and went off to bed. Next morning the agcoran had reassembled itself, had started gluing sand and pebbles to its striated hide, and was cruising slowly over the bottom of the aquarium. It was smaller than it had been.

Dr. Potkin was in my chair, running the recorder memory. "Good morning, Hank," she said, intent on the video. She was short, square, gray-haired, and brilliant. "Thanks for messaging me about your agcoran."

I'd triggered the coffee pot on the way here, and poured myself a cup, looking at the critter. "'Morning, Dani. It's different," I said. "The dark and light stripes are in a different order. And what happened to the missing stripe? Missed the

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orgy?"

It had had nine stripes, some wider than others, and the end views were distinctive. Now it had eight, and they weren't in the same order.

Dani glanced around. "We'll soon know. My theory is that the agcoran is a composite animal made up of those little siphons you see everywhere in the water."

"Something closer than a cell colony, but not yet a true individual," I mused, staring at the critter and warming my hands on my cup.

"You are the evolutionary biologist," she said. "But do all those striped fish make you think?"

"I don't think you can rip them apart like an agcoran," I said. "Even if the stripes represent former free-swimming siphons. Whatever odd evolutionary path they've taken, now each fish is the basic individual."

"Look at this," Dani said, slowing the record. "They're starting to join here. There, again. A group of three meets a joined pair and they slither around and merge."

For a long time the record just showed glimpses of the siphons and the slowly agglomerating agcoran ambling around the tank. Then the five-fold *swallowed* one of the siphons—jet-pulsed up over it, surrounding it on all sides.

"Ah!" Dani cried. "That's new! The beginning of specialization—one siphon becomes a gut!"

"I assumed that the inner portions of each siphon became porous," I said slowly. "Dani, do some work on siphons before you start concentrating on agcorans. Are the siphons composite animals too?"

She swiveled in my chair and stared at me. "Damn you, Henry. Yes, you may be right. And I need to know about speciation in siphons before I can even think about it in agcorans."

"All those tiny jelly-blob things, myxoblasts, in Behanan's waters," I said, watching the agcoran pulse slowly across the rocks on the aquarium floor. "Maybe this combination trick is a very old one."

We were still reviewing records and talking when Larry Arkenberg staggered into my office.

"Hate to interrupt," he rasped, and rubbed a hand across his whiskers. He hadn't shaved in a couple of days.

"I'll be in touch," Dani said. "I think we have the key to Behanan evolution right here." She left.

"Have you slept since I saw you last?" I asked Larry. I hadn't seen him since he'd brought me the diamond dust problem.

"Dozed a little here and there," he said vaguely. He was clearly beyond the reach of coffee, but I poured him some anyway. He drank half the cup, said, "The diamonds. Dunno if we're gonna be able to settle this planet."

"So far you've kept our fleet running," I said cautiously. I knew he'd sprayed foam sealant around all the Scrambler and robot wheel bearings.

"That won't last," he said. "Even with the bearings, we've just slowed it down 'cause foam vibrates off and duct tape won't stick, and the robot arms . . . steering gear . . . solenoids . . . locks . . . hinges . . . ."

"How about the air report I had done, you seen that? It says the diamond dust is worst in the Beta desert, and least in the Gamma jungles. Along the seashore it's worse than most places inland—"

"But it's not zero anywhere." Larry waved a hand. "Anyway, that don't matter. Our problem is immediate. We're losing the windows out of the Scramblers and even our houses."

"The *windows?*"

"Mostly around the Beta desert, I admit, but every continent has spots dry enough to develop dust storms—and where's there a place where there isn't an occasional dusty wind? And when a wind blows diamond dust against a window, especially if the Scrambler's running into it . . . ."

I was already groaning.

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"An occasional scratch we can live with, or some scoring, but at Beta Station Five every window facing west was turned into bathroom glass overnight."

"The consortium is going to love this," I growled.

Behanan's World Development, Inc., was our sponsor. They would eventually make a million fortunes by selling settlement rights to colonists, not to mention shipping, factories, even the right to give the planet its official name—you name it, anything the settlers would need, they'd supply. Particularly the specialized knowledge needed for survival on this new place to die. Knowledge we were here to get.

"The settlers'll have to diamond-plate all their windows," he said heavily. "Or use transpex."

"Keep track of everything you try, whether it works or not," I said grimly. "The consortium's in too deep to back out now—I hope," I added, as he staggered out. "Get some sleep!"

That night there was a fight at HQ Common—the community restaurant, bar, church, assembly hall, and dance hall. I didn't hear of it at the time—it was broken up quickly. Even if I'd heard of it, I wouldn't have connected it with Carmilla Prentiss.

It was Dr. Paukstelis who informed me, the next morning. There was a message from him when I cued my pocket brain: *Urgent! Don't discipline Carmilla Prentiss till you talk to me!*

I was shaving when I got it, and glanced at the pale neutral wall beside the mirror. *Alan?* I thought sharply. My PB automatically filled in his Planetweb address.

In a moment his message came back, in dark letters stark against the bland wall: *Henry! Listen, Carmilla's hot on the trail on the DNA problem—you mustn't derail her now!*

I haven't had any complaint. What's the problem?

Fight last night, but she wasn't involved. He added that a medical technician and one of Larry Arkenberg's laborers had mixed it up over Carmilla. She'd been belly-dancing topless.

Unless she egged them on, I have nothing to discipline her for, I replied. *How's she doing on the job?*

Wonderful! Her PB must be the only brain she's got, but when she remembers to wear it, she's a phee-nom.

"Idiot savant," I said aloud. It was a common phenomenon in the age of the pocket brain. He agreed and we signed off.

"What?" My wife, the beautiful and wonderful Madge, looked into the bathroom and frowned. "Henry Rufford! How many times do I have to tell you not to start work before breakfast! You'll ruin your digestion."

Madge is from the U.S. Midwest, where, apparently, digestion is a major topic of conversation. "Yes, dear," I said humbly, smiling to think how Johnny Simmen would build on my henpecked husband act.

I flew up to Alpha-Seven a couple of days later because Dani Potkin had arranged a show of our work for Dr. Samantha Yoshida. Dr. Yoshida, at forty-seven, was the Grand Old Woman of comparative biology. The consortium had sent her here to vet our work.

The centerpiece of Dani's presentation was a collection of shallow aquaria, both freshwater and seawater. "We have evidence, which we are still pursuing, that these siphon worms themselves are conglomerates of the myxoblasts, what Dr. Rufford inelegantly calls 'jelly-blobs'—those little slime-mold things on the viewplate, there. They're just visible at the largest size, and most are microscopic. Myxoblasts appear to be what you'd expect if sponges and seaweeds and other cell colonies had remained small and gobbled up all those niches between unicellular forms and, say, the smaller bugs."

She moved down to the next row of aquaria, which held aggcorals. "Here,

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we think, is the next step in evolution above the siphons. Highly organized cell colonies."

Dr. Yoshida looked curiously at the agcorans in various stages of reassembly and accretion, and attentively watched the videos of them being torn apart and reassembling.

"Yes," she said, with a gleam in her eyes. "Next?"

"Next, we think, are true multicellulars, such as fish. We seem to be in luck here, for we think the local fish evolved twice. The second time, apparently fairly recently, we think we can show that they developed from agcorans."

The next aquaria held fish striped from head to tail, and the video showed them being cut in half, to yield cross-sectional views. In the cross-sections, the bodies were stippled with different colored spots, like an irregular honeycomb. In longitudinal dissections, the muscles and even organs, glands, blood vessels, and nerves, all tended to follow the stippling.

"As if the individual siphons had specialized in different tasks," Dani observed.

"Fish evolved twice? How about the older evolution?" Dr. Yoshida asked.

"We have no proof, and little evidence, that they evolved from siphons," Dani admitted. "Nor the higher organisms. But there's no conclusive evidence that the First Fish did *not* evolve from congregated siphons. And therefore, maybe the terrestrial pseudo-vertebrates also."

Only on Earth do chordates thread their spinal cords through their vertebral columns. So much for "intelligent design."

Dr. Paukstelis was present, and nodded vigorously. "In fact, there is already evidence from the DNA that this congregating is a very old evolutionary strategy. It antedates multicellularity, and possibly even cells."

That got all our attention, and the local access for Planetweb must have slowed under the strain as everybody tried to access Alan's research at once. But he hadn't yet published.

"Perhaps I shouldn't mention this yet, but the picture we are assembling is striking. On Earth, cells swallowed each other and cooperated—mitochondria, chloroplasts. Here, we find a similar arrangement, with a greater loss of individuality—we think. Certain DNA strands are doubled."

"Doubled?" I asked. Then I thought, Of course, that would explain much of his puzzlement.

"Yes! We have evidence that in many—though by no means all—species on Behanan's World, there is a second double-spiral of DNA around the primary one. Perhaps because a second cell has joined forces with the primary one."

Dani nodded, beaming—she was apparently the only one Alan had confided in. "Yes! Congregation and cooperation appear to be primary forces in the evolution of life on Behanan's World."

Dr. Yoshida patted her hands together in applause. "In my role of spy slash fink, you can be sure I'll report this to the consortium." Then she sobered. "It does seem that you've found an important handle to understanding autotochthonous life. But don't push it too far. There's no way it will explain everything."

"My wife will agree with that," I said.

She smiled at me. "Dr. Rufford is a general biologist?"

"Madge started as a veterinarian, went into XT work, and that led her into everything from comparative to evolutionary biology. But animals are still her major love."

Dr. Yoshida nodded. "One must know the organism whole, to know it at all."

Afterward, I had a few words with Alan. "This doubling of DNA—I take it that solved your problem with the number of nucleotides?"

"Yes, in a fascinating way," he said, his eyes lighting up. "Behanan's World has

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set a record—in doubled organisms we observe seven nucleotides. In singular organisms, only six."

As opposed to four for Earthly life, but many planets have more than four. Only one has three. The level of complexity of life is comparable on all planets observed but one, and that one is precious. It's Archaia, of course, where life is probably less than a billion years old.

"Perhaps life here evolved twice, once with six and once with seven nucleotides," he added.

I frowned. "Possible, but too soon to say."

He nodded. "We have too little data and too many questions."

It turned out that his insight as to the doubling had only occurred in the past week.

"Carmilla Prentiss's work in collating our data was critical in getting at the theory," Alan said. "Even with all our technology it's difficult to observe a living cell without killing it, and a dead cell isn't a live one, as Dr. Yoshida pointed out. We were doing mass assays of DNA, but hadn't the time or the skills to collate the data."

"I know you have good statistics programs," I said.

With the advent of interstellar travel, there was a revival of old Twentieth Century sci-fi. As an undergraduate, I read a story by a man named Simak, which involved robots capable of being swiftly altered from one specialty to another by means of plug-in programs called "transmogs." Not bad prediction, dating as it did from before computers. With pocket brains, humans could be "transmogged" almost as quickly and efficiently.

But not quite. The organic brain directs the inorganic one, and there must be both latent talent and actual training of the organic brain.

"We need her more than ever," Alan said quickly. "With this new insight, we need to reconsider every—"

I sighed. "All right, all right. It's just that Dr. Mendez and his geologists need her too. They've got enough raw data, they think, to assemble a pretty comprehensive picture of both the deep structure of the planet, and a good general history of its plate tectonics." I rubbed my head. "Maybe they'll let us indent for another Statistical Analyst."

"We can hope. Knowing the continental wanderings would certainly be a help in unraveling the evolutionary windings."

"Yes," I said, and blinked at him, touched. Scientists rarely raise their heads above their own problems, and continental drift didn't affect his study. It was crucial to mine, however.

The next morning my shaver stopped working—whined down, grated and growled, then seized up and merely hummed. Cursing mentally, I rummaged around for my dad's antique blade razor and started working up lather with liquid soap.

I opened to Planetweb to access Larry Arkenberg's status report on the diamond dust problem, and immediately got an "Urgent" flash from Dr. Paukstelis.

Msg me before you deal with Carmilla Prentiss.

I did a quick scan through Planetweb, and found it under Security.

Tell most laymen that you have a scientific expedition of 5,562 people and they'll assume you have that many scientists. I wish. I had fewer than a thousand, even counting Carmilla. The rest were support personnel—Larry Arkenberg and his mechanics and techs; the rough labor section; Jenna Kristapovich and her tiny personnel staff; the medical section; transportation; even a minute Security section, with a two-room jail on each continent. So far the jails had only been used for cooling down drunks.

That was what the HQ jail had been used for last night.

A fistfight at the commons again, and this time the medical technician who'd been involved in the first fight over Carmilla Prentiss had been jugged.

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I managed not to cut myself shaving, but I wasn't in a good mood when I went in to cook breakfast. Madge came in glowing, from her early morning visit to the animal pens.

"Larry has got to do something about the diamond dust. My swiveling video recorders—" She threw her hands up when she saw my face. "Now what is it?"

"Diamond dust and Carmilla Prentiss," I said. "I prefer diamond dust, even if my shaver did go kaflooie this morning. It's easier to deal with."

Madge laughed. "I went to the Common a couple nights ago, after you told me about her, and checked her out. She's an innocent if there ever was one. I'm sure she's not even conscious of the availability signals she gives off. Trained in seduction by a devoted Dad, I'd guess."

"And not brains enough to connect cause with effect," I added. "Just another monkey."

I was going to have to do something, but what? When I got to Admin, it was to find that Jenna was in conference with Transport over a possible Contract Article IX violation—airtruck drivers being forced to do maintenance work that Larry Arkenberg's section was supposed to do. Larry was short-handed, especially since so many of his robots were out of action.

I called Johnny Simmen, and his handsome, smiling face appeared in my viewplate.

"Johnny Card—oh, it's you, boss, Füehrer, Fearless Leader—"

I cut him off in mid-Nazi salute. "You know anything about this Hans van den Burg?"

"I know he's in the calabozo. Drinking, fighting, and conduct unbecoming. It was a large evening—you old married men miss a lot of fun."

I raised my eyebrows. "I might have known you were there. Did Carmilla Prentiss have anything to do with that fight?"

He shook his head: "She tried to stop it, in fact. José misread her, or thought that escorting her there gave him rights. And of course Hans has been acting proprietary for a week now. Not his first fight over her."

"What do you think of her?" I growled.

He laughed. "Attractive and probably available, but lacking not only wit, but the ability to appreciate it."

"In you, you mean." I sighed, and said, "I'll have to have a word with her." Futile, of course, but I called her.

Before she arrived, there was an uproar outside and I ran out to find one of Madge's Type Three hexapods rippling through the compound like a giant centipede. I got in front of it. Panicked, it came right at me.

Never let them tell you a herbivore isn't dangerous. Its back was no higher than my elbows, but its length gave it plenty of mass, and the blunt claws on the feet could do damage. I got out of its way, and as it came even with me, flung myself on its neck.

I couldn't stop it, but I could deflect it. It pushed me back, my toes slipping on the cloverlike ground cover, my face in its fine dense floss—black stripes on tan. It exuded a faint, pleasant vinegary odor—Madge had mentioned acetic acid in the sudor of the pseudo-vertebrates.

After a tense, muscle-cracking moment, it turned. I broke, faded back, and flung myself on it again, only vaguely aware of the shouts and footsteps of people coming up. Again the strain, and again the hexapod yielded, and now it had only a narrow opening between me and the corner of the Admin building.

I broke, panting. Ellen Muñoz dropped a lariat over its neck and a dozen hands tailed on. Presently they had it hobbled and were leading it back to its pen. It went with head hanging down, its breath coming with a whistle and catch that sounded like a small child trying not to cry. I watched it with a pang of sympathy, and was startled

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when Carmilla Prentiss took my hand.

"Oh, Dr. Ruffles! You were wonderful! You saved that child's life!"

"What?" I looked around and saw behind me a fourteen-year-old boy, Gerald Saotomi, the son of one of our MDs. He had apparently come running up to help. As I saw him, his excitement visibly turned to outrage at her words.

My reaction was much the same, but better concealed. Even as I opened my mouth I realized it would be a waste of time to correct her on my name—she'd used one of Johnny Simmen's nicknames for me.

Instead I disengaged my hand and took her into my office. She immediately helped herself to one of the Werther's Original chocolates from the dish on my desk. I urged her to be more circumspect around men. Her eyes got big and teary and she promised, like the little girl she was, to be good, sucking on candy the while.

Madge was right, I thought, watching her go. She hasn't an inkling.

Hans van den Burg, in the can, was sullen, but more genuinely contrite, I thought.

"Man," I said, "can't you see that she's not even trifling with you? You don't mean even that much to her. She can't keep away from men, but for the most self-centered reasons."

Hans nodded grudgingly. "Yeah, the morning after, I can kinda see it," he said. Psychometrics gave even laymen some insight. "But at the time . . . ."

The monkey acts first, the man thinks later—if ever. There was hope for Hans—many don't think, even later.

"You mustn't take it so personal," I said. "I'm sure it isn't calculated, but her interest in men turns everyone on."

"Everyone but you and that damn Johnny Card," he said, half enviously. "He laughs at me."

"Name anybody he doesn't laugh at."

He grinned at that and shook his head ruefully.

"Which," I mused, thinking out loud, "is why she avoids him. Like most self-centered types, she takes herself very seriously."

I turned him loose and he had the grace to thank me, shamefacedly.

"So, did you make a date with her?" Madge asked me later, in the barns. "I saw her latch onto your hand, you bold hero you."

I grunted. "I'd respect her more if she'd made up to me because I'm director," I said. "That would have been rational. Falling for a big strong ape is a monkey reaction."

For a while things were merely normally chaotic, and I had time to ponder the problem of taxonomy, what Johnny Simmen called "the Adam problem". It was made worse by the dawning realization that some of our early conclusions about evolution on Behanan's World were not right.

There is a conventional solution to the initial "Adam problem" of what you call a weird native creature. Anything that lives in an ocean is a "marine" organism, anything that lives in and along streams is an "aquatic", anything that flies is an "aerial", and so on. On every planet we've found, there are things that look like trees (pedants prefer to call them "dendroids") and things that look like fish (thankfully, not even pedants insist on "ichthyoids"). Obviously squirrels and tree frogs and orchids are not closely related, though all could be called "arboreal". But it's a start.

Scientific nomenclature must be more precise. At first glance, we'd identified two of the primary taxa, or "kingdoms" as they used to be called: plants and animals. How many more primaries there'd turn out to be, we didn't try to guess. After hundreds of years, there's still debate on the number of Earth's primary taxa. We hadn't got many of the secondaries yet, what used to be called the phyla.

We had "vertebrates"—and evidence that the fish evolved twice. Further, we now had evidence that the land verte-

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brates evolved from bugs.

There were two main kinds of bugs, six-legged "hard-shelled" and eight-legged "soft-shelled" (duruconchs and molliconchs), the former not unlike Earthly arthropods. The molliconchs had thick, indurated skins and were not obviously different from the hard-shells, but under dissection, they turned out to have rudimentary, disarticulated skeletons—mostly leg stiffeners. Even number of legs was no criterion, as both groups tended to lose legs to other uses.

Alan Paukstelis's team had found both anatomical and DNA evidence that the land vertebrates evolved from these molliconch bugs, not from fishes as on Earth.

"What are you going to do about Christmas?"

I blinked and stared at Johnny Simmen. "What?"

He whistled and waved his hand in front of my face. "It's Christmas! 'Tis the season, jingle jingle, jolly old Saint Nick, and so on."

"Yes, I'm aware of the phenomenon," I said testily. "What should I do, put a stop to it?"

He grinned. "Kill a tree and hang lights like albatrosses around its neck. You're the Pooh-Bah, you know. Pooh-Bah-Humbug. Send out a little proclamation, welcoming the first Christmas on this new and nameless world. Have the kids ferried to Island Seventeen, where there's snow, but it's not too cold. I'm getting up a webcast about a mysterious object hurtling through space from Earth's North Pole."

I sighed. "I suppose you're right." Then I looked at him. "You're so right you probably already have that little proclamation in first draft."

"Why, yes," he said innocently. "In fact, if you hadn't come out of your trance, I was going to send it out over your signature."

"I'll send it out," I said.

He would've sent it out under one of his nicknames for me. He'd gone from "Henry" to "Hank" to "Hanky-poo" to "Pooh-Pooh" to "Pooh-Bah" in two days. And now Pooh-Bah-Humbug.

I read it over and sent it out, and found myself remembering the scent of brown sugar. My mother always burned brown-sugar scented candles for a week before Christmas. I never thought to ask why, and now it's too late.

This wasn't our first Christmas off Earth, and the wonderful Madge had come prepared. She hung the Christmas tree poster that had been in her family for two generations, and we stuck superfoxfire lights to it.

The next week or so is a blur in my memory, a haze of research, Christmas carols, a major shemozzle between Meteorological and Geophysical, journalists more fascinated by Christmas on our nameless new world than by our research, every shaver on the planet going bust and a lot of scraggly beards, Johnny Simmen playing Santa (quite well; he loved children), and, finally, just a couple of days before Christmas, another fight.

This time Carmilla Prentiss was involved. In fact, she apparently started it, at least she started screaming at José Miranda. It spread to several men before it was broken up. Hans van den Burg was not involved, I was pleased—and surprised—to note.

I called Johnny Simmen and got his "theme music"—*Also Sprach Zarathustra* played by a kazoo band. He appeared in my plate with a red, swollen nose.

"Got a bloody nose breaking up last night's fight," he said complacently. I was rather startled—it didn't fit my profile of him. "Now I look more like Santa than ever. Or Rudolf."

I grunted. "Now I can do something—Carmilla got involved. I'm going to exile her. Cut orders transferring her to Gamma Station Three."

Gamma Three had only a couple of dozen people, and few unattached men. Carmilla would find it boring, but too bad. The rest of us had work to do.

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"Alan isn't going to like this," Johnny said, smiling more widely than ever. "Can I tell him?"

"No, you scapegrace, I'll tell him. But he hasn't got a kick coming. Carmilla can work well enough from G-3. There's a neutrino transmitter there—she can access Planetweb as readily as from HQ."

It turned out that Hans van den Burg had transferred himself to Beta Station Five the day before the fight. That showed more sense than I had credited him with.

For couple of weeks, things went a little smoother. Christmas came and went. Larry Arkenberg got some sleep and turned in some recommendations for settlement. He thought it would be cheaper in the long run for settlers to go to transpex windows over diamond-plating glass.

Transpex, being a fortalic—a microscopic biphase—has to be formed in shape. It's sapphire with glass infused between the crystal units. Gem-hard and steel-strong, as the advert says, and, as it doesn't say, jewel-expensive.

After our first messages home about diamond dust, the consortium had asked if it would be necessary to go to forium bearing races. Forium, like transpex, is a fortalic. It's composed of boron carbide, with platinum-iridium between its crystal units—terribly expensive, but harder than diamond.

Larry didn't think forium races would be necessary. Better design could exclude dust, he thought, and diamond-clad races with diamond bearings could be used.

I released his report, and found that the press had discovered Alan's report on the bug ancestry of the pseudovertebrates. The reporters asked a lot of silly questions about bugs being the ancestors of the "main line" of evolution on the planet. Again I had to explain that there is no main line of evolution on any planet, including Earth. Life is like a wave coming up on shore, going around every rock, seeping between sand grains, moving into every space.

No point in trying to convince them that the ultimate ancestors of Earthly vertebrates were worms.

Then there were the usual silly questions about gene-splicing. Would we be splicing local genes into imported biota? As patiently as I could, I explained that our ability to parse genes implied no understanding whatever. What the colonists would eventually do, I could not predict.

I wish they would only send science reporters to new planets.

Then the teenaged daughter of a junketing politician stole a Scrambler—I mean, "borrowed", God help us all—and rolled it, totaling the body. She escaped with a broken fingernail, which apparently peeved her. She was even more peeved when one of our laborers, who'd been following her—"pursuing" according to her and her father—hauled her "roughly" out of the wreck by her arm and "used abusive language and threatened her with assault".

He'd said, "I ought to turn you over my knee, you little bitch!"

Damn it—I was just getting into the current research on the micro life of Behanan's World. There were a dozen and more tantalizing hints about the evolution of life there—Dr. Yoshida's comment about aggregration not being the whole story of evolution was being borne out. In fact, there was evidence that it was the *losers* in the survival sweepstakes which went in for aggregration. None of the more successful, or at least most common, bacteria showed duplication of the nucleus—

I sighed, and thought about this Marcia Agnew.

She herself, we could handle. Her father, Senator Aristide Agnew, was apparently a power in the European Union, and he was vociferous in her defense. I did a tentative psychometric calculation and came to the conclusion that he was fond of her, but, more important, took

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her as an extension of himself. He was reacting as if his own position was threatened.

His monkey-instinct defense was to counterattack. He stormed into my office demanding an official apology and the offending laborer fired, or at least disciplined. His threats were implicit but obvious. I had some trouble soothing him out.

"How much trouble can he make for us?" Madge asked me anxiously.

I looked out our cabin window at a storm making up over the Spritely Sea. "Not much to us personally," I said. "We agreed that this would be the only time we'd take the directorship of an expedition. It'll give us both names that will enable us to find a good niche at any number of institutions on Earth. Since research these days is mostly funded by big corporations like the ones that form Behanan's World Development, the senator's pull can't stop that. And if we choose to emigrate to one of the colony planets, we'd be welcomed with open arms. There just aren't enough scientists to go around. No, he can't really touch us."

"But if he makes trouble for the consortium, they might—well, they can't blacklist us, but the component corporations might be reluctant to fund our chairs afterward?"

"Again, I don't think so," I said. I admit I was troubled. "The big consortiums are trillion-dollar aggregrates. The component corporations themselves are wealthy and powerful, and not easily bullied. Their executives can do math, and the senator's personality is readily calculated. This affair is too easily understood for any self-serving lies to get far."

Madge was silent, unconvinced.

"You think I ought to take it seriously? Do something to defuse him?"

"What can you do?" she asked, troubled.

"I'll sleep on it," I said.

We were of the first generation raised with pocket brains from childhood. Kids these days are not educated as we were. The modes of thinking, with and without the PB, are quite different—we were trained to think both ways.

With the pocket brain, total recall and instant access, plus immense computational abilities, are the primary factors. Hundreds of subtle programs—logic, statistics, epistemology, semantics, psychometrics—are available, to be applied even without conscious awareness. Using my PB, I built up a fair picture of the minds of Senator Agnew and his daughter. It was not difficult; theirs were not complex personalities.

Even in the era of psychometrics and unbeatable lie detectors, politicians had not changed. We govern ourselves with apes.

Then, preparing for bed, I took off my pocket brain, and experienced the nightly casting down from heaven. From being a super-genius I became a moron. Or so it seemed, at first. But in fact I am a highly intelligent man, and quite well educated—anything you do with the PB tends also to carry over into your organic brain.

I switched back to organic brain mode. No longer could I know in detail; now I could think only in outline, and in blocks of imperfectly glimpsed data. But the OB is a massive parallel processor, and I had set it a problem in monkey-behavior that it had evolved to deal with.

Even in the age of the pocket brain, there is need for intuition. And in the morning, sure enough, I awoke thinking of W.C. Fields: *You can't cheat an honest man.*

Right after breakfast, I invited father and daughter in for a conference. He came in truculently, declined to shake hands, put his fists on his pelvic bones, or as close to them as they would go. She stood to one side and stared at me, pouting and aggrieved.

"Well? Are you going to discipline that roughneck?"

"No," I said, bluntly but not belligerently.

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"What?! I tell you—"

I raised my voice. "I'm charging her with grand theft auto."

His eyes bulged with outrage. As he sucked in his breath for a bellow, I spoke quietly again.

"And I'm charging you as accessory after the fact."

He turned purple and bounced up and down, gobbling incoherently for a moment. I gave him time, but when he became coherent, it was simply abuse. I held up a hand and grinned nastily; this quieted him.

He said, coldly furious, "All right, this finishes you. I'll take care of *you* if it's the last thing I do. Go ahead, what were you about to say? Make it good!"

"This conversation is being visually recorded," I said mildly, glancing at the recorders on the wall. "But what I started to say was that you'll both be tried in Expedition court, and your testimonies will be taken under MRI verification. Also, I have authority to open the psychometric files of accused felons."

He had been contemptuous till I mentioned the last item.

Psychometric files, containing as they do a very accurate mathematical description of the individual's mind, are of course sacrosanct. I had the power to seize their pocket brains and open their files, as I said—if I charged them with felonies.

He sneered at me. "You'd never dare."

"Oh, I think I can justify it. I notice that your daughter's criminal record did not follow her—either a computer glitch, or a criminal offense. But I requested it from Earth on yesterday's rote ship; we'll have it in a week or so. And I also requested the record of actions dismissed. I'll bet, sight unseen, that political influence got her off most of them. If so, you could be impeached. Also, you're an unfit parent—you've raised a daughter with a criminally high sigma ratio, who's never learned to care for anyone but herself."

He had been containing his rage with visible effort all through my speech. Indeed, requesting her dismissed actions was quite high-handed. I'd had to assert a pattern of interference on his part. My neck was stuck out a mile if he cared—or dared—to prosecute me, back on Earth. But their testimony would be taken under verification—lying and evasion would be impossible.

Then I added, "What'll that do to your political career?"

He closed his mouth, then called me something in, I think, Greek. But it was only Greek to me.

"And of course, when you're convicted here, the relevant parts of your psychometric record will be released, as part of the criminal record."

At that he turned pale.

There is a strong belief among many people that their psycho profile is found only in their record. Nonsense, of course. Everything you do and say reveals you to anyone who has the (mathematical) key.

I could see him thinking: What his enemies could do with that . . . .

"Wait a minute," he said, and swallowed. "We're—it's not—no harm was done, there's no need for all this—this—"

"No harm? A Scrambler totaled, not to mention all the threats you've been making, your insistence on punishing a man who did nothing—"

"I made no threats!"

I gestured toward the recorders. "You threatened to get me if it was the last thing you ever did. Your other threats were more circumspect, but were well understood. That's why I want to open your psychometric file."

"Well, wait a minute, can't you? I was just—I lost my temper, I didn't mean anything—"

"Well," I said temporizingly, and his ears pricked up. "Perhaps we can talk this over."

"Yes?" he said, looking at me suspiciously.

I said, "I've named a negotiator—Yves DeMarais. He's waiting in the confer-

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ence room. I've given him full authority. I'll abide by any agreement he makes with you."

He thought it over briefly, and agreed.

For the first time I spoke to the sulky girl. "Be kind to Dr. DeMarais. A few months ago his only child, his fourteen-year-old daughter Ysabelle, was bitten and killed by a venomous bug."

Marcia Agnew blinked but showed no other reaction. I put her down as brighter than Carmilla Prentiss, but not as good a person. Her father's eyes narrowed. Obviously thinking how to take advantage.

Ysabelle—"Easy"—was a beautiful, lively, charming girl whom everyone loved. Especially Johnny Simmen, who teased her unmercifully, to her delight. But everything delighted her; "her smiles went everywhere," as Browning put it.

Yves DeMarais was one of our botanists and Easy was helping him do a study of plants in a brushy meadow, when she suddenly screamed in pain. She ran toward her father, fell down, and began to thrash. That ended with the paralysis that killed her—stopped her lungs—half an hour later. All she had been able to say was something about a bug. A review of her pocket brain's video record was no help, as it saw only what she impressed on it. It had no eyes of its own, unlike the PBs of regular researchers, who wore headbands with eyes. A vague image of something too much like an Earthly spider, as big as her fist—we couldn't trust it.

Her frozen body now lay in our morgue. We had found traces of an alkaloid both in her liver and at the wound. We never found the culprit, and lived in dread of another death.

Her parents were stunned, but carried on. All who knew Easy shared the feeling. For months Yves had performed his duties like a zombie, but he had not gone soft or stupid. I knew he wouldn't settle for less than the departure of father and daughter on the next ship out—and he didn't.

Naturally the senator swelled around for the next several days, hinting at how he had terrorized me into dropping charges against his darling daughter.

Funny. Psychometrics proved to be a big boon for advertisers, political campaign managers, and writers of self-help books, but very few people use it, even when it's in their PBs. They still go on instinct and conditioning. Even politicians like the senator apparently didn't—nor did he expect it to be used against him.

While psychometrics is descriptive rather than predictive, it was obvious that he intended to raise ring-tailed hell on Earth. His position in the monkey-dominance pattern had been threatened.

I paid him no mind—Madge's problems were more important.

Our corps of Observer robots had been decimated by diamond dust. Fewer than half were still working, and those were mostly the ones detailed to watch nonmigratory animals. Much of her science depended on observation of animals in their natural habitat.

As I walked along the beach, pondering the problem, I kicked a rock the size of my fist. I picked it up—a diamond, of course. The light filtered through its rough surface and lit up the interior. It was of the highest clarity, colorless, worth a fortune on Earth. Cut and polished—I turned it about, peering into it—yes, there must be two or three flawless chunks within, each as big as the last joint of my thumb. And any number of smaller ones.

I dropped it and continued up the slope, to where I could look down on Alpha Station Nine. A sprawl of prefabs rambling over a flattish area a few meters above the sea, with low heath-covered hills at its back. Farther back, tree-clad hills; in the distance, mountains blue against the pale horizon.

On the far side of the village, a lighter bulked, a great yellow fortalic bulb big enough to carry all the buildings at

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once. Overhead, the rote ship orbited, a three-hundred-fifty-meter globe, waiting.

The lighter lifted off, taking the senator and his daughter with it, triumphant at having yet again defeated his enemies.

Unbeknownst to him, it also took my private report to the consortium: a complete account of the theft of the Scrambler, a suggestion that his daughter's criminal record might have had pressure applied, accusations of his unfitness for parenthood, and the visual record of my two interviews with him.

There was enough there for impeachment. Public servants, rightly, have fewer civil rights than private citizens: he'd have to defend himself under MRI verification. He'd never dare do that.

Well, you can't blackmail an honest man.

Two days later Hans van den Burg went missing from Beta Five.

Naturally we did everything. We sent in airtrucks with radios to locate his pocket brain, without response; we reviewed all the visual recorder records around the Station; we queried all the robots in the area; we sent people and robots searching. To no avail.

The failure to get even a position response from the PB suggested either that he'd crawled far back into a cave, or fallen into the sea. Or committed suicide. After a couple of days we called off the search.

This tragedy was counterpointed by farce. Carmilla Prentiss wailed from Gamma Continent, stirred up by the enterprising journalists, God bless them. Now that he was missing, presumed dead, Carmilla was sure that Hans was the great love of her life.

Pity there wasn't a nunnery on the planet.

A week later I read with irritation a report from Delta Subcontinent. Botanists had found there a cloverlike plant with aromatic leaves containing caffeine, and immediately thought of tea. It was a good thought; a colony needs a source of revenue. They had spent some months analyzing the leaves and testing them, on animals and vat-grown human tissues, and found no adverse effects.

When they finally drank some of their tea, they were ecstatic at the wonderful "golden" flavor. Until they were afflicted with what Johnny Simmen gleefully dubbed "pissarrhea".

I was less amused. Caffeine itself is a diuretic, and all those polysaccharides in the analysis ought to have given them a clue. That was sloppy work, and I opened to Planetweb to compose a memo to Botany to have their knuckles rapped.

Planetweb immediately chimed an emergency, which turned out to be the opposite of an emergency. Hans van den Burg had turned up at Gamma Station Three, having sailed a homemade boat across fifteen hundred kilometers of First Ocean and another hundred up Gamma River Seven. The ecstatic journalists were flashing the faces of Hans (gaunt and bearded) and Carmilla in a variety of poses. They were to be married immediately.

Carmilla was transported. Hans looked a little bewildered.

I sent them my congratulations and a retroactive permission for Hans to absent himself from his post of duty, plus a week's leave. He was correct in assuming that "the authorities" would not have authorized a transfer, but dammit, he could have dropped in on her for a weekend visit. Plenty others had.

Gamma Three was too small for a med tech on continuous duty, but we shuffled assignments to find him a post nearby on Gamma Continent.

He might be happy with her. Surely he'd not be bored. Anyway, I didn't have to attend the wedding. It got major coverage in the local media, which declared it to be the most romantic event on the planet. Romance is not far from idiocy; but then, I'm idiotic about Madge.

Some time later I looked up, and realized that we'd been on Behanan's World for over seven months. Almost half a lo-

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cal year. I called some conferences and we started hasty drafts of our semiannual report. We were scheduled to be on the planet for a minimum of one planetary year, and it might be two—not even time to scratch the surface.

What did we have to report?

Well, we had a good picture of the interior of the planet and a beginning of a geological history. We had a fair grasp of the planet's weather patterns. On the biological side, we'd ascertained that many of the plants and animals were edible. We'd identified two primary taxa and eight secondaries—myxoblasts or "jelly-blobs", siphon worms, First Fish, seed-bearing plants, phytoplankton, fungoids and two kinds of bugs, hard-shelled and soft-shelled. We'd identified eighteen tertiary taxa derived from bugs, the pseudovertebrates; and three more derived from the First Fish—three classes of aerials. There were still a number of genera of flying fish skimming briefly above the waves, to demonstrate the evolution of the various aerials. The leap directly from water to air explained the lack of legs on the aerials, and their consequent ophidian appearance.

"It'll only take a few minutes to tell them what we know about Behanan's World," Johnny Simmen said.

True; the hard part of the report was to indicate what we needed to know—and justify to accountants the expense of learning it. That would be, especially, the biochemistry.

It was a hazy week of conferences and drafts, interrupted by press conferences filled with reporters desperate for copy, anxious discussions with Madge on how much value we could claim for her barely-begun studies of the pseudo-vertebrates, and all the usual crises.

Johnny Simmen called and requested visual while I was examining, with bleary eyes and mind, a report on the toxicology of the local plants. Even on Earth, many thorns are tipped with poison, and so on Behanan's World. But here, we weren't as immune to the poisons. The stinger bush, in particular, had crude hypodermic syringes for thorns. I'd never heard of any plant with that. Their poison-brew was much like that of honeybees on Earth, which kill more people than snakes. A better cattle fence than *Rosa multiflora*, the authors of the report suggested—

Irritated by Johnny's interruption, I sent his signal to the viewplate.

"I thought you'd better see this before the Press does, if possible," Johnny said. For once he wasn't smiling. "She's probably already talking to them, but—"

"Carmilla?" I said, or groaned. She'd only been married for a few weeks.

But she wasn't filing for divorce—she had applied for permission to have a baby.

"On a frontier planet? Not even a colony planet yet," I said.

"Someone has to be the first," Johnny said, with a detached smile.

I glanced back at the toxicology report. There was much in what he said. Notwithstanding Easy DeMarais, most of our deaths had been industrial accidents—Scrambler wrecks and the like. Stinger bushes weren't as widespread as bees and wasps on Earth. The large predators tended to ignore us—we didn't smell of vinegar. And eventually the settlers were going to have to face the risks. There really wasn't an environmental reason for saying no.

"The Medical Committee will advise against it," I mused aloud. "But if it vetoes, it will have to give a specific reason. And it can't."

Johnny lifted his brows. "After what happened to Easy?"

I shrugged. "True, we can't test every organic compound on the planet, but we haven't been dropping like flies. Johnny, keep this confidential, of course. I'm going to have to sleep on it—there isn't any obvious reason to deny her, not that would stand up under appeal."

That night I told Madge, who was not surprised. "But I can't think of any good

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excuse to refuse, either."

I opened to Planetweb and requested Carmilla's psychometric record, citing her application. Her pocket brain responded, noting the date and time of the request, the requester, and the reason for the request. Her profile was much as I had expected. It was not complicated, for Carmilla was a very simple woman.

Human psychology is "chaotic"—meaning not that it can be anything, but that reactions cannot be predicted reliably. So I was not surprised to be surprised. She was a lot more intelligent—on paper—than she seemed.

Such surprises are common; it's a question of modules. Johnny's irreverent sense of humor would not be predictable, nor my love of trees.

Psychology got its start early this century, in animal studies. They finally realized that testing animals for "intelligence"—a complex of human attributes—was futile. They needed to test for the attributes of the animal itself. What does it take for a horse or dog to survive in the wild? In short, they needed to test for the "horsiness" of the horse, the "dogginess" of the dog, and, as Johnny put it, the "cattiness" of the bitch. (He did not love his ex-wife.)

With that hint, psychologists began to ask themselves what the attributes of humans are, and began the still ongoing struggle to express them in math: psychometrics. In the process they found that intelligence is not as big a component of our makeup as had been thought. The monkey instincts are more controlling than the intelligence factors.

When I took off my pocket brain that night, I lay awake for some time, pondering Carmilla Prentiss. That, and envying Madge the much simpler problems her animals posed her.

Johnny Simmen was among the first to enter my office next morning—he didn't have enough work to do, I thought.

"What excuse are you going to use to turn Carmilla down?" he asked.

"Haven't been able to think of one," I said abstractedly. All I'd come up with was a dream: Carmilla sitting in a tree with all the rest of the *Bander-logue*. Sister, thy tail hangs down behind. But I didn't know what it meant, if anything. "It's a pretty thoughtless decision, even for Carmilla. But then, she's always operated purely on monkey instinct."

Johnny raised his eyebrows and said, amused, "Somehow I *expected* you to subscribe to Frisch's thesis that the human race is not intelligent. But is it fair to judge us by Carmilla?"

"If we were intelligent, wouldn't we think better?" I countered. "Wouldn't we think *more?*"

"Oh, come! Surely you don't think we don't think!" He was wearing his baiting smile.

I had to smile myself at the neat way he put it. "We don't," I said. "Classic example: what were your parents' politics when you first began to think about politics? What politics were popular when you were an undergraduate? What are your current politics? You answer the first two questions, and I'll give you a pretty accurate answer to the third. The same with your religion. We almost never think about the things that are important to us. Hans would never fallen for Carmilla if his brain had been functioning."

Johnny said, "I suppose you used a purely rational process when you chose Madge?"

"No, I'm as much a monkey as anyone else. I made an emotional decision."

"He liked my tits," said the wonderful Madge, entering.

"And your dazzling smile, dear," I said.

"So *he* says, *now*," she said to Johnny, demonstrating the dazzle.

Johnny would never admit to embarrassment. He examined her solemnly and said, "That strikes me as a pretty rational decision, even now."

"Is he—" indicating me— "bending your ear about the Frisch theory? I've

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told him not to do that. People have enough problems." She opened one of my cabinets and started to rummage around.

I quoted from William S. Gilbert, *Princess Ida*:

"'Darwinian man
though well-behaved,
At best is only a monkey shaved.'

"There's evidence that we evolved big brains, not to think with, but to live longer with."

Vertebrates on Earth characteristically live for about a billion heartbeats, reptiles living more years than mammals of the same size because their hearts beat more slowly. Heart rates decrease with size, so that mice and lizards live short lives, while elephants, at four to six tons, attain the Biblical three score and ten.

Humans in the advanced countries averaged about that at the end of the Twentieth Century, about 2.5 billion human heartbeats. Less than a hundred years later we've added another quarter century to that. Clearly the massive control centers in our heads preserve us far beyond the "natural" limits for animals of our size.

"Thinking is an unexpected byproduct, or so Frisch claims," I said. "Not proven, difficult or impossible to prove, but provocative. It helps explain why we've never found a trace of any other intelligent life. Did you ever see 'Anthropoids'?"

Johnny and Madge both laughed.

This comedy video is not a scientific document, but it's popular among anthropologists. It consists of alternating scenes of a couple of chimps screaming furiously at each other and jumping up and down, and a pair of roughnecks yelling insults, on the verge of a fight, in the parking lot of a seedy bar. The producer transposed the soundtracks, skillfully matching vocals to mouth movements. The point of the humor being that both recordings seem natural.

"What are we, after all, but talking monkeys?" I asked, maybe a little bitterly—I needed to get more sleep.

"And yet, we achieved the stars," said Johnny softly, in one of his unpredictable switches to solemnity.

"We can use our brains for anything a monkey doesn't care about," I agreed. "Though we usually don't. But when it comes to sex, or food, or our children, psychometrics becomes almost predictive."

Psychometrics—from another discipline prior to Frisch, we are basically talking monkeys. In that, I thought suddenly, might lie Carmilla's salvation.

"You know the press will buzz around your ears when you turn down her romantic request," Johnny said, smiling with that delight we take in the misfortunes of our friends.

"I think," I said slowly, "I'm going to recommend to the Human Resources Committee that she and Hans be unlocked."

Madge and Johnny exclaimed in surprise.

"God help the baby, but there's every chance that having one will bring Carmilla out of herself. The hormones," I added, smiling at Johnny's expression, "all those protective monkey reactions—nothing grows a person up faster than responsibility."

"You see, he doesn't decry monkey instincts," Madge said to Johnny. "He uses them."

"Maybe I should have a baby myself," Johnny said.

"Until we have something we *know* is better than our instincts for social life, we'll do better not to tinker with the mechanism." I shrugged. "It works. It works even better, now that we're beginning to understand it."

"So, because she's a talking monkey, Carmilla will have the first baby on the world. And I'll get to be a monkey's uncle." He started making *Kk-kk-kk* noises and scratching his ribs.

"Oh, go away, Johnny Simian," I said. "Some of us have work to do." ■

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The Telling, Ursula K. Le Guin, Harcourt, $24, 264 pp. (ISBN: 0-15-100567-2).

Deepsix, Jack McDevitt, Harper, $ 25.00, 448 pp. (ISBN: 0-06-105124-1).

Shadow of the Hegemon, Orson Scott Card, TOR, $25.95, 366 pp. (ISBN: 0-312-87651-3).

The Prophecy Machine, Neal Barrett, Jr., Bantam, $6.50, 342 pp. (ISBN: 0-553-58195-3).

Ceres Storm, David Herter, TOR, $22.95, 253 pp. (ISBN: 0-312-87493-6).

Plumage, Nancy Springer, William Morrow (HarperCollins), $23, 234 pp. (ISBN: 0-380-80120-5).

The Science Fiction and Fantasy World of Tim White, Tim White, Paper Tiger (distributed by Sterling Publishing Co., 387 Park Avenue South, New York, NY 10016-8810), $21.95, 144 pp., (ISBN: 1-85028-057-6).

Something New Under the Sun: An Environmental History of the Twentieth-Century World, J. R. McNeill, W. W. Norton, $29.95, 421 + xxvi pp. (ISBN: 0-393-04917-5).

It has been far too long since Ursula K. Le Guin's last novel. **The Telling** is thus an event to be noted and celebrated.

The tale is set in Le Guin's Hainish future, realm of *The Left Hand of Darkness* and *The Dispossessed*, her laboratory for the examination of alternate humanities. This time the focus is on the world of Aka, first contacted some seventy years before by human representatives of the Hainish Ekumen. Unfortunately, the report on Aka's culture came back to an Earth in the grip of a frantic religious bigotry that sought to bar humanity's doors to the Hain, the Ekumen, and the Universe. Reception was garbled or sabotaged; only fragments survived to inform the students at the Ekumen's Earthly academies, one of whom was this novel's narrator, Sutty.

Sutty is a very sympathetic character. She has felt the oppression of closed minds, both in the closing down of opportunities and in the loss of loved ones to terrorist destruction. When she reaches Aka as a representative of the Ekumen, she finds another kind of oppression. The Akans are now in the grip of an eager quest for spacegoing civilization. Science! Technology! and Progress! are all. The old ways are "rotten-corpse" ideology and religion—anti-progress, regressive, oppressive. The centers of the old culture—repositories of books and ritual—have been destroyed. Those who held to the old ways have been reeducated in labor camps or slaughtered.

Sutty is frustrated, for she knows nothing of this Aka. It is new, sudden, inexplicable. But soon she gets permission to visit the hinterland, where she finds traces of the old ways, makes friends, discovers a people who are really surprisingly reasonable, pragmatic folks, and in due time is invited to travel deep into the mountains to visit the last repository of the ancient writings, which have much more to do with recipes and instructions, stories and poems, exercises and arts, than with anything resembling religion. They are, in other words, Aka's culture—"the Telling," expressed

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in public recitals and readings and demonstrations, the wealth of metaphors and images and skills that have developed over millennia. And the modernists want to trash it all in their quest for the future.

Been there, you say? Done that? Well, yes, we have. Harcourt's press release even says that Le Guin, in her preface to the novel (which is not to be found in the book), "notes . . . that Aka's strong resemblance to China during Chairman Mao's cultural revolution is not coincidental." Yet Le Guin is not simply translating Earthly history to alien worlds. She is deeper and more subtle than that, and when Sutty has her chance to discuss the mistakes made on Earth and Aka with one of the modernists, we see what may be the real point, that the past, existing culture rich with roots and identity, is valuable, worth maintaining and preserving. Progress has value when it gives us useful things, but not when it becomes an ideology, pursued for its own sake alone.

There is more, for Le Guin makes it very clear that the Telling is not anything like religion. It is too chaotic, too diverse, despite the ethnic near-homogeneity of the Akans. It is indeed culture—literature and art and folkways, down-to-Earth and practical, with no component of belief in supernatural beings. It offers no salvation, no hope of relief from earthly suffering; it is no "opiate of the people" to be condemned by Marxist or Maoist revolutionaries.

Here on Earth, of course, dogmatic modernists have attacked the past in much the same way as those on Aka. The attacks have often focused on religion, but we must recognize that the classic scriptures tend to be compendia of literature, poetry, recipes, and folkways closely akin to the documents that record the Telling (I exclude modern scriptures such as the Book of Mormon). For us, religion and culture are largely inseparable. Le Guin's insistence on separating the two is a strong clue to her intent: A reconciliation of sorts between C. P. Snow's two warring cultures.

This one is deft and thoughtful, and for all the intellectual comment I have sketched, really quite lyrical in tone. A pleasure to read.

You are going to love Jack McDevitt's latest, **Deepsix**, and when you are done turning its pages, you too will pray that Hollywood sees the light and makes the blockbuster movie.

Deepsix is a doomed world. It has been in an ice age for millennia, thanks to the dimming of its sun by an interstellar dust cloud, but that's not the problem. The real trouble is a Jovian giant emerging from the cloud, booking it into Deepsix's system, and yanking it out of orbit. Soon it will suck the world down, first stripping it of atmosphere, then crust, and of course, life.

Scientists are thrilled. An Academy expedition is on the scene, ready to record every moment of the cosmic train wreck. They're also doing a photo survey of Deepsix's surface, and much to their surprise they spot ruins. Nothing like that was supposed to be there, for no signs of intelligence had been spotted twenty years before, when a survey expedition was run off by the local wildlife and its leader, Randall Nightingale, was disgraced.

Naturally enough, the Academy wants a closer look before everything goes down the gravitational tube. Unfortunately, the scientists didn't bring a lander with them. Fortunately, another Academy ship—with a lander—is just a few days away. Its captain is Priscilla Hutchins (whom we last met in *The Engines of God*, reviewed here in April 1995). One passenger is a reclusive Randall Nightingale. Neither is terribly happy at having their journey diverted; Nightingale, in fact, doesn't want to go anywhere near the scene of his long-ago debacle, especially when the tour ship shows up, loaded with sightseers

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among whom is the stuffed-shirt journalist, essayist, and opinion-molder Gregory McAllister, whose testy misinterpretations of the Nightingale debacle had much to do with turning it into a disgrace.

Hutch, Nightingale, and a few others descend to the surface and begin some hasty salvage archeology in an icebound tower of much the sort common in medieval Europe. Soon McAllister shows up in the tour ship's lander. There is tension, and then there is disaster. With only 255 hours to go before the planet falls apart, an earthquake wrecks McAllister's lander and his companion crashes the other. All are stranded.

Meanwhile, in space, the scientists have found a strange object—a bundle of rods, three thousand kilometers long, attached at one end to an asteroid with a net of metal mesh. It doesn't take long to figure out that it is the upper portion of what had once been a space elevator. On a world of medievaloid ruins.

What the . . . ? McDevitt lets the clues mount up before he has his characters figure out what had once happened. Meanwhile, Hutch et al. are trekking overland, finding more ruins as they try to reach the disabled lander left behind after the Nightingale expedition. Can they repair it enough to get off the planet? Everything is riding on the answer, and time is running out.

And nuts! The lander can fly, but it can't reach orbit. Now it's up to the scientists to get clever, and for luck and sheer guts to do their utmost. The scene is fascinating, as dramatic as anything in SF, the characters are genuine enough to care about, the tension is unremitting, and the finale is the sort of thing that could bring a movie audience to its feet cheering.

The film would need some pretty special special effects, but these days that's not a problem.

Still revisiting the success of *Ender's Game*, in **Shadow of the Hegemon**, Orson Scott Card focuses on Earth shortly after Ender Wiggin left for the colonies and the children of Battle School returned home to their parents. Those children, however, are hardly the children who left their parents' bosoms. They have fought and won a war. They are accustomed to their own competence and potency; to be treated as children—told to eat their vegetables, sent to schools where they know more than their teachers—rankles.

Their reactions are close kin to those of the newly adult—fresh from high school or college, full of their own competence and potency—who return home for visits. Perhaps you remember how it was when you too were treated as the child you used to be, even acquiesced to the familiar role, and breathed a huge sigh of relief when you got away again.

The Battle School children can't escape. But there are people who know how valuable they are. Peter Wiggin, for one, warns the head of the world's space defense force that the kids will be vital resources to any nation contemplating war—and war is inevitable. He is brushed off, but he is quickly proven right as the kids are abducted by a mysterious agency. Only Bean escapes. Fortunately, though he is the youngest of them all, he is also the brightest.

Who are the abductors? It is clear only that the psychopath Achilles, Bean's archenemy and a master schemer, must be involved. He serves a nation that craves world domination, but when Bean and Peter Wiggin shine a spotlight on him, he quickly shifts allegiance. He serves only himself.

Bean and Peter? Yes, they become allies, and Bean's brilliance indeed carries the day even as Peter sets himself up to become the head of a weakened world government or Hegemony. We knew that would happen from Card's other books, so I reveal nothing by saying that. This one's charm lies in the conflict of child and adult roles, the defiance of ex-

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pectation that we find in children who outscheme adults and villains. That surely makes the book one that teens—chafing under the restraints imposed by adults—would enjoy, but Card is not writing for children. His lessons are for adults, and his focus on children makes those lessons clearer, uncontaminated by the glandular matters that must come into play with older characters.

You don't want lessons? Never mind, then. Card is a master of plot and pace. *Shadow* is a page-turner; you can't help but enjoy it, especially if you enjoyed its predecessors.

In **The Prophecy Machine**, Neal Barrett, Jr., has posited a magical world where, centuries before his story, renegade wizards transformed nine species of animals into human form. The Mycers are sleek enough, but hardly timorous. The Dobbins wear floppy hats and smocks. Grizzes like fire. There are Bullies with rings in their noses and Bowsers with monocles, Yowlers and Badgies, Foxers and Vampies. And none of them count; known as Newlies, they are looked down upon as jumped-up animals—not real people at all—persecuted, and marginalized.

Perhaps you can already see a few sly winks and nods to the reader, but they are only by the by. The tale has much more to do with the adventures of Finn, a craftsman who makes lizards—machines to do various tasks. His supreme achievement is Julia Jessica Clagg, to which he added the brain of a ferret; she sits on his shoulder and sasses him constantly. He is, however, much more pleased with his wife, the Mycer Letitia Louise.

He is so pleased in fact that he has booked a vacation journey aboard a ship which—very much to Letitia Louise's discomfort—turns out to be crewed by Yowlies. "Bishops and Bunnies," he cries (he has a way with words, he does). "Flannels and Flapjacks. But something must be done." And as soon as he is done earning the enmity of the bizarre Sabatino Nucci and the ship puts in at an island port, he and his wife go ashore to stretch their legs.

Alas, the island is Makasar, where hospitality is a crime and religious fanatics—Hatters and Hooters—roam the streets in search of victims to slice and burn. Soon they are fleeing for their lives, falling in despite themselves with the Nucci family, taking a room in their chaotically dilapidated manse, and learning that there is a mysterious and awful thing in the cellar that Sabatino's deranged Daddy would like a Master Lizard-Maker to consult upon. Meanwhile, the Nuccis, father and son, are leeringly demonstrating that unlike many, they have no difficulty in contemplating miscegenation. Finn wants out—but their ship has gone on without them, and there is no alternative exit.

The mode is black farce, enormous amounts of silliness mixed with menacing magical doom. But the silliness makes the ominous hazards seem less than truly threatening, while the looming doom makes the silliness seem weak. I did not find the mixture fully successful.

David Herter's **Ceres Storm** is an impressive first novel. Its setting is the Solar System of ten millennia hence, which is a wonderland of futuristic marvels, yet also something of a wilderness preserve, surrounded by a civilization whose people have been strangely transmogrified by nano and other technologies. The preserve's keepers are the Krater-Tromon clan, based on Triton.

Meet Daric, just a kid growing up on Mars under the tutelage of his shade (an internal AI), his elder brother Jonas, and Grandpapa, who resides in a bronze bust and tells tales of an ancient ruler, Darius, who dominated humanity for a millennium, loosed the nano-storm that destroyed Earth, and ended as a tree.

As the tale opens, Daric has a chore: to visit the city all by himself and pur-

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chase an informational drink that will fill his head with a sense of every star and planet of the human realm, a sense shared by those who navigate the galaxy. On his adventure, he encounters those who show a strange interest in him, and not long after his return home, head all awhirl, he is kidnapped. He is, it seems, a clone of that ancient Darius and only he can gain access to the ancient trove of weapons and other marvels buried beneath the storm on Earth.

Daric is an innocent, but he is astute enough to take advantage of those opportunities that come his way. Soon he is being addressed by Darius's remaining servants as "Your Glory" and equipped with a powerful spacecraft. Yet soon he is a captive again, the center of vast schemes, and still an innocent, at the mercy of fate and serendipity.

And at the end, he plainly stands on the threshold of a new adventure. Expect a sequel, and look forward to it. Herter shows immense promise.

Within a few pages of starting Nancy Springer's **Plumage**, I knew who I was going to give it to. You may too, for we all know people whose life stories resemble that of the protagonist of this charming parable. Sassy (Sassafras) married straight out of high school and spent two decades being a wife (but not a mom—no kids). She submerged her personality and identity in her effort to satisfy Hubby Dear, and in the end he took up with a chicky and left her. She lost her security, her house, and even her jewelry, such as it was. As *Plumage* opens, she is working as a maid in a luxury hotel.

She is quite righteously pissed. And very quickly she is pooped as well, for as she labors in the hotel's vaulting atrium, something strikes her head. There is movement among the leaves of the ficus-on-steroids overhead, and when the statuesque and extraordinarily froufrou Racquel from the "Plumage" boutique nearby comes to see what the fuss is about, she finds bird poop in Sassy's hair. Parrakeet poop. Carolina parrakeet poop. *Extinct* Carolina parrakeet poop.

And when she looks in the lav mirror, she can't see herself. There is only a blue budgie. Worse yet, the mirror images of *everyone* have been replaced by birds. Racquel, for instance, is a hornbill. A *male* hornbill.

And then Sassy starts falling through mirrors into a jungle world where one can find—with luck—whatever one has lost. What Sassy has lost is no mystery; Springer's effort goes into making her admit it and look for it, and the result is as warm, charming, and illuminating as any book I have seen in at least a decade.

It's also funny as can be, especially when Racquel, in full transvestite drag, goes to the supermarket to see what sort of toad is Sassy's ex. Right there at the checkout, he hits on "her," and "she" comes up with an absolutely killer line for him. I roared.

Enjoy.

Paper Tiger continues to bring us displays of sf&f artwork by the major artists of the field. The latest (first published in 1981 by Dragon's World, Ltd.) is **The Science Fiction and Fantasy World of Tim White**, whose work of the seventies often showed quite organiform machines with trimmings of doubtful utility but undoubted pizzazz. White's detailed, evocative approach has surely influenced many of the artists whose efforts can be seen in every con art show.

In **Something New Under the Sun: An Environmental History of the Twentieth-Century World**, J. R. McNeill tells us that the environmental impacts that resulted from the interactions of burgeoning population, technological development, shifts in energy use, politics, and economics in the last hundred years are unprecedented in both degree and kind. McNeill lays out

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with admirable conciseness and thoroughness the changes that have affected populations and economies, soils and waters, atmosphere and climate, fishes and forests, and our relationships with germs and other living things. He also notes that a worse omen than anything we have done to our environment may lie in the way we have come to accept as "normal" a very temporary situation, marked by ample supplies of fossil fuels, land, fresh water, and other resources, that "is an extreme deviation from any of the durable, more 'normal,' states of the world over the span of human history, indeed over the span of earth history" (p. 362). We are thus not prepared for the inevitable and perhaps drastic changes ahead.

The patterns are dismaying, but McNeill is unwilling to project inevitable disaster, for the effects of technology are not unrelievedly disastrous. The automobile brought us oil dependence, urban sprawl, and air pollution, but it also replaced the horse. "In 1920 a quarter of American farmland was planted to oats, the energy source of horse-based transport . . . Horses deposited thousands of tons of dung on the streets, making cities pungent, fly-ridden, filthy, and diseased" (p. 310). The automobile's "country cousins"—tractors and their ilk—mechanized agriculture and made it possible to feed a much more populous world.

If we avoid disaster, then, it may be because we find new technologies that solve at least some of the old problems (though they may create problems of their own). McNeill suggests that genetic manipulation and information technology may be at the center of the next technological "cluster" but cautions that it is really too early to tell what their role and eventual impact may be. For now we must be best served by putting our effort into research aimed at replacing present polluting energy technologies and into hastening the demographic transition to balanced (low) death and birth rates.

Is there hope? The future, says McNeill, is inherently uncertain, and right now it is more uncertain, more volatile, more chaotic than ever before. "A greater number of radically different possibilities exist because technology has grown so influential, because ideas spread so rapidly, and because reproductive behavior—usually a variable that changes at a glacial pace—is in rapid flux" (p. 358).

So, yes, there is hope. ■

WHAT WEENA KNEW

Continued from page 65

His shoulders slumped. "We've learned nothing. We're just as helpless as before." He looked at the sun as it slid below the horizon. "The night's coming. We should go to the home."

In the distance, the hills glowed pink. A line of skinny clouds in the west flamed brightly in the sunset.

Weena said, "No. We should gather wood and pile it by the home's door." She fingered the box of matches. There were enough to get them through this new moon, or they could keep the fire burning constantly. They had time to solve the problem of making fire for themselves.

"What good will that do? We need the giant to save us," said Blythe.

Weena looked at him. The giant had said that her people had built the structures. They had commanded great tools. Once the night had been theirs. If she could see it; if Blythe could see it, there would be others.

"No, Blythe, we don't."■

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BRASS TACKS

Dear Dr. Schmidt,

Analog is always one of my most welcome pieces of mail and has been for the last thirty-five years. The October issue was no exception. There were, however, a couple of things in the fact-based sections of the magazine that seemed worth commenting upon.

Ashley Carter's "The Limits to Evolution" was quite interesting but I think the title was inappropriate. The actual title should have been, "The Limits to Evolution of Earth-Based Life" The point he makes that any living system is just that—a complex system—is quite important. Because the different components of the system are in evolutionary equilibrium with respect to each other, a radical change in one is likely to have disastrous results for the operation of the system. At this point, however inefficient, say, the chemistry of cellular energy transformation is, there is no way to alter it. This would not preclude such systems evolving in other independent environments. We may yet see Wodenites!

There is an interesting parallel to Carter's argument in my own field of economics. Here the question is whether inefficient economic institutions can persist despite the availability of superior alternatives. The literature on this phenomena of "path-dependence" is vast and highly contentious. Like natural systems, an economy is an extremely complex and interrelated system where change in one component is likely to dislocate all other elements. Can we be saddled with inefficient systems in the long run (the QWERTY keyboard for example) or will market competition eliminate inefficient alternatives? It is still an open question.

My other comment is on Jeffrey Kooistra's Alternate View column. I'm quite sympathetic to the goal of human colonization of the universe. (And we've got to start somewhere, so why not Mars?) However, having read Zubrin's book quite recently, I am a little (very tiny bit) sympathetic with Dr. Park's criticisms. I found *The Case for Mars* to be filled with airy assumptions about what resources would be found there that would enable human colonization. That isn't to say that Mars can't be colonized, but it will require a substantially greater understanding of the nature of the Martian environment than we now have or will likely have in any of our lifetimes. (Personal note: One of the hardest parts of my thirties was the realization that the wonderful dreams of space flight and colonization of space weren't likely to happen while I was still around to enjoy their benefits.)

Other than these quibbles, it was a great issue. *Analog* is basically the only fiction I read these days, but after more than thirty years, it is still the best.

John H. Brown

Dear *Analog*,

I enjoyed reading Kathy Oltion's short story "Graveyard Shift" in the October 2000 *Analog*. I am a chemist and have worked in industrial chemical laboratories for over 40 years. I am familiar with most of the instruments described in the story, although I do not have medical or

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pathology lab experience. I have used thin-layer chromatography, gas and liquid chromatographs and GC-Mass Spec instruments. One item in the story stuck a jarring note. The protagonist used a refractometer to measure the specific gravity of a urine sample. Refractive index is not a measure of density or specific gravity. Refractive index can be used to measure dissolved solids in water.

In my first job while going to college, I worked for a vegetable canning company. In their lab we used a refractometer to measure the sugar content of sweet corn, in order to determine when it was ready for harvest. In this case, the refractive index is proportional to the sugar content. It might also be proportional to the density of the juice, but that is not what it measures. In fact, a water solution of ethanol, with a specific gravity less than 1.0, will still show apparent dissolved solids and will have a refractive index higher than that of water. A hydrometer or pyncnometer would be a better instrument to determine specific gravity.

I have been reading *Astounding/Analog* for 45 years, and still look forward to each month's issue.

Bob Swenson

Dear Dr. Schmidt,

I enjoyed Jeffery Kooistra's unsparing critique of Robert Park's poor argumentation (10/2000 "The Alternate View"). But Mr. Kooistra slipped in an off-topic argument of his own: "Even granting that the Newman machine doesn't really work, an in-depth look at how it could have fooled those with a technical background would have been invaluable".

Invaluable to what end? Experts have been fooled many times before, wishful thinking often playing a role. Granting that the device doesn't work (i.e. doesn't produce more energy than it consumes), concedes the only real issue concerning it. But perhaps Joseph Newman could cash in by writing a "How I Fooled the Experts" book.

In summer 1996, a couple of Newman's advocates, seeking "investments", began posting to a BBS discussion group I frequented. Their approach to questions was roughly as follows: Any counterevidence was due to a conspiracy. Doubters were either fools or conspirators. They couldn't disclose where the excess energy came from, for fear someone would steal the technology. This appeared to limit "admissible" questions to those based on the premise that Newman's machine, perfected in 1979, worked as claimed. So I asked if Mr. Newman was still buying his electricity off the grid. Another participant verified that he was. From Newman's advocates there came neither denial, explanation, nor abuse. Instead, their posts abruptly ceased.

Also, in the 10/2000 science fact article "Limits to Evolution", Ashley J.R. Carter describes a functional constraint imposed by what is often referred to as the "square-cube law". He cites Swift's "Gulliver's Travels" (1726) to show that mass varying as the cube of a linear dimension is not a new concept.

However, neither the square-cube law nor the functional constraint were new concepts, even in Swift's time. The "Second Day" of Galileo Galilei's "Dialogues Concerning Two New Sciences" (1638) contains an explication of the square-cube law, including the following passage (which appears on p.130 of the Dover edition):

". . . nor can nature produce trees of extraordinary size because the branches would break down under their own weight; so also it would be impossible to build up the bony structures of men, horses or other animals so as to hold together and perform their normal functions if these animals were to be increased enormously in height; for this increase in height can be accomplished only by employing a material which is harder and stronger than usual, or by enlarging the size of the bones, thus changing the shape until the form and appearance of the animals suggest a

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monstrosity".

Galileo's subsequent discussion even includes a sketch showing the distortion in shape required by tripling a bone's length! It would appear that his analysis of the functional constraint has stood the test of time rather well.

Kurt Foster

Dear Stanley,

I read your editorials every month and usually I enjoy them, but October's hit very close to home. I left my job of three years and my "career" of 28 years in June because I just could not take it anymore. The last two jobs I had started out quite well, but rapidly deteriorated as management went in pursuit of the "bottom line" and forgot about service & employee well-being. Both firms offered great benefits and an 800 stress line service. I do not know of anyone who took advantage of the 800 number—no one had time after the down-sizing began. We were requested to work long hours and weekends for "comp time" but few people had time to take it. The last firm I worked for was Swiss and the foreign employees got 4 weeks vacation from hire, but us poor dumb Americans only got the requisite 2 weeks. Needless to say, most management positions went to the foreign employees. My one boss spent his day reading car magazines and playing solitaire on his computer, when he wasn't taking one of his vacation days. The rest of us were working our butts off with no particular direction. He got a transfer and promotion while the rest of us were left to clean up the mess. Needless to say, many people quit and few were replaced. I stayed to help get over the crunch and was rewarded with an $8 a week raise and enough stress to fuel quite a bit of "road rage" on the way home at night.

I am now taking the summer off, refinishing furniture, reading, painting and getting my head back together. Thankfully my husband has a good job and I can afford to do this. A lot of the women I worked with were single moms or had to work to pay tuition, etc.

I used to love what I did, but thanks to "the bottom line" I can no longer say that. I hope that employers soon get wise to the fact that they have to improve working conditions or they will no longer have reliable and dedicated employees. Many people, especially women, *have* to work, but they don't *have* to be treated as chattel. Where I worked last, everyone was working at 110%. If someone was out for any reason (sickness—theirs or a child's, vacation, doctor's appointments, etc.) there was no one who could cover their work except in a very rudimentary fashion. Therefore you had to work twice as hard to get caught up before you left (if possible) and work lot of extra hours to get caught up when you came back. Very unfair.

Gretta Germroth

Dear Mr. Schmidt,

Thank you for your editorial "Stress Management" in the October issue. As a nurse, the greatest stress is not being provided with enough nursing, pharmacy, laboratory, or housekeeping staff to give quality care to patients. The hospitals and HMOs have reduced the number of people, eliminated education departments, and called us unprofessional when we got together to work on solutions. I think it is more unprofessional to be forced to stay until noon when a nurse came to work at 7:00 p.m.! We are told there are no studies that show a nurse cannot give the same quality care in the sixteenth hour of work to twenty patients with three helpers with eight hours training (and obviously no licenses) as we could give to five less ill patients fifteen years ago. What facility would allow such a study? They don't have any empirical evidence that an RN *can* give equal care to five or twenty patients. Logic, our experience, and our hearts tell us we cannot. This one person wants the good readers of *Analog* to tru-

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ly believe that anyone could become sick or injured. The *only* reason for a person to be admitted to a hospital is nursing care. All other services can be obtained as an outpatient or in a hotel. I pray for the end of good people in bad systems making deadly mistakes. I have bought copies of *Analog* for five offices of the California Nurses Association (www.calnurse.org) and many nurses were heartened by your understanding of what is going on in the business world today.

Kathy Carder, RN

Hi Stan,

I read with interest your Editor's Page on stress management yesterday. You got everything right.

I spent twelve years doing management and supervisory training for the Customs Service. I still remember one manager from Chicago who used to say he didn't *get* stress, but he gave it, as if that was good management. Nobody could tell him any better, and his people hated working for him. I don't know for a fact, but I'd bet his production was low.

People who work for tyrants tend to play it safe and concentrate on staying out of trouble, as opposed to taking the lead and trying to get things done. Energy always implies a risk, and if you're going to get your head bitten off, you just don't go that way.

Everything I've seen on the subject, by the way, indicates that a person's attitude toward his job is only peripherally affected by salary, promotion potential, and fringe benefits. The major factor is his relationship with his immediate boss. So if the boss is a dictator, a nitwit, or someone himself dedicated to staying out of trouble, things will not go well. We used to quote a line from *The Leadership Secrets of Attila the Hun*: "Take care of your Huns, and your Huns will take care of you."

Speaking of leadership, I cringe every time George W. starts talking about how he's going to lead. I try to imagine FDR or Winston running around assuring people they're good leaders.

One of the interesting aspects about piling pressure on people is that it is sometimes done with the best of intentions. A good example: an employee who has proved himself competent and reliable gets all the difficult tasks for that reason, while the incompetent and lazy drift through their lives at the office, drinking coffee and talking on the phone, because managers won't confront them.

We used to warn our managers particularly about this tendency because it's so common, and the manager seldom realizes he's doing it, or believes he's paying some sort of tribute to the subordinate.

We all know that people should never have to pay a price for doing what we want them to do, or for excelling, but nonetheless, there it is.

Another example is the simple failure to acknowledge good work, or to take it for granted, which seems to the manager like good John Wayne leadership, but which really has the effect of suggesting to the employee that the manager doesn't care one way or the other how he performs.

Jack McDevitt

Dear Stan,

I have just gotten access to an archival copy of the April 2001 issue of your magazine and was shocked at the gross disrespect that putative physics purveyor of preposterous propositions Kooistra showed to that fine writer, Bud Sparhawk. I find it completely believable that this barely literate—witness his poor attempts at fiction that have appeared mercifully infrequently within your pages—Kooistra was unable to comprehend a set of straightforward directions.

So disturbed was I by Jeff Kooistra's mischaracterization that I borrowed a phlomb-powered time machine from K'tchxavxpft (the "xpf" is silent) to send you this retro-wise e-mail.

Sam Boone ■

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UPCOMING EVENTS Anthony Lewis

30 March–1 April 2001
I-CON 20 (Long Island SF conference) at Stony Brook N.Y. Media Guest of Honor—Majel Barrett Roddenberry. Special Guests—Harlan Ellison, Timothy Zahn, Ray Harryhausen, Harry Turtledove. Registration—$31 until 15 March 2001, $37 at door. Info—I-Con, Box 550, Stony Brook NY 11790 phone—(631)632-6045 fax—(631)632-6355; e-mail—<info@iconsf.org> URL—<www.iconsf.org>

12–15 April 2001
NORWESCON 24 (Seattle area SF conference) at Doubletree Seattle Airport Hotel, Seattle-Tacoma, Washington. Guest of Honor—Connie Willis, Artist Guest of Honor—Bob Eggleton. Fan Guest of Honor—Charles N. Brown. Registration—$45 advance, more later. Info—Norwescon 24, Box 68547, Seattle WA 98186; phone—(206)270-7850 e-mail—<info@norwescon.org> URL—<www.norwescon.org>

12–16 April 2001
SWANCON 2001 (Western Australia SF conference) at Rydges Hotel, Perth, WA, Australia. International Guest of Honor—Robert Silverberg, Fan Guest of Honor—Sue Ackerman, Australian guests—Rosaleen Love, Marilyn Pride, Lewis Morley, Kate Orman. Info—Swancon 2001: Masquerade, Box 162, Nedlands, WA 6909, Australia; e-mail—<swancon2001committee@egroups.com> URL—<www.sf.org.au/swancon2001>

13–16 April 2001
PARAGON 2001/EASTERCON (UK National SF Convention) at Hanover International, Hinckley, Leicestershire, UK. Guests of Honor—Stephen Baxter, Lisanne Norman, Michael Scott Rohan, Claire Brialey & Mark Plummer. Registration—£35. Info—Paragon, c/o S. Lawson, 379 Myrtle Road, Sheffield S2 3HQ, UK; e-mail—<members.paragon@keepsake web.co.uk> URL—<www.keepsake web.co.uk/paragon>

20–22 April 2001
EERIECON THREE (Lake Erie area SF conference) at Days Inn Riverview, Niagara Falls, N.Y. Guests of Honor—Samuel R. Delany and Robert J. Sawyer, Poetry Guest of Honor—Carolyn Clink. Registration—$30 until 15 March 2001, $40 thereafter. Info—Buffalo Fantasy League, Box 412, Buffalo NY 14226; e-mail—<eeriecon@juno.com> or <eeriecon@scifispace.com> URL—<www.geocities.com/area51/9159>

30 August–3 September 2001
MILLENNIUM PHILCON (59th World Science Fiction Convention) at Philadelphia Marriott, Philadelphia, Penna. Guests of Honor—Greg Bear, Stephen Youll, Gardner Dozois, George Scithers, TM—Esther Friesner. Registration—$160 after 30 September 2000; supporting $40. [These are the latest rates posted on the Internet as of the time this column went to press.] This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Info—Philcon, Box 310, Huntingdon Valley, PA 19006. email—<philcon2001@netaxs.com> URL—<http://www.netaxs.com/~phil2001>.

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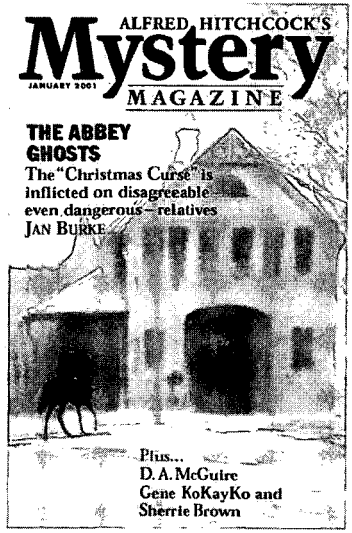

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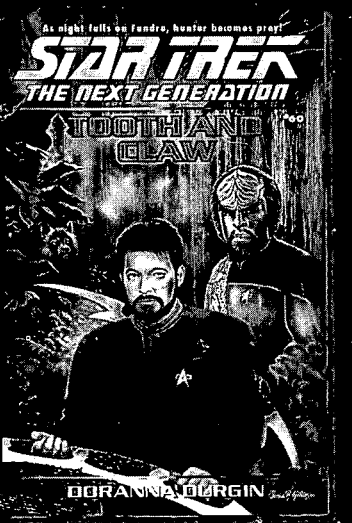

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